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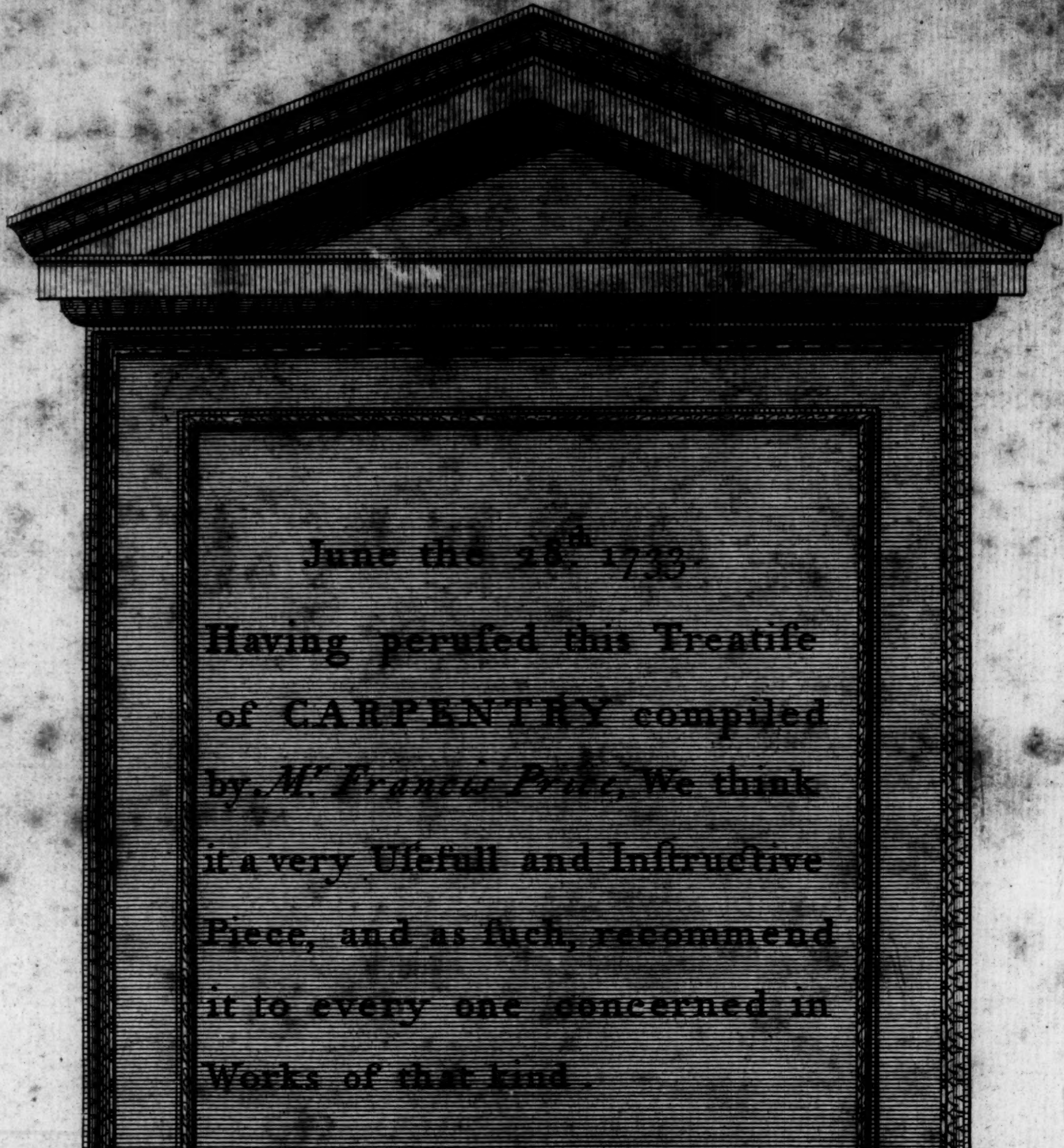

June the 28th 1733.

Having peruſed this Treatiſe of CARPENTRY compiled by M^{r} Francis Price, We think it a very Uſefull and Inſtructive Piece, and as ſuch, recommend it to every one concerned in Works of that kind.

N. Hawksmoor.
Jn^{o} James.
Ja. Gibbs.

F. Price inv *Toms ſculp*

35,616

THE *BRITISH CARPENTER:* OR, A TREATISE ON CARPENTRY.

Containing the moſt conciſe and authentick

RULES of that ART,

In a more

Uſeful and Extenſive METHOD, than has been made Publick.

The FOURTH EDITION enlarged,
And illuſtrated with Sixty-Two COPPER-PLATES.

By *FRANCIS PRICE*,
Late Surveyor to the Cathedral Church of *Saliſbury*, and Author of a Series of Obſervations on that admirable Structure.

LONDON:
Printed by C. ACKERS, in St. *John's Street*;
For C. HITCH and L. HAWES, at the *Red Lion*, and R. BALDWIN, at the *Roſe*, in *Pater-Noſter-Row*. M.DCC.LIX.

BRITISH MUSEUM
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TO THE RIGHT HONOURABLE
ALGERNON,
Earl of *Hertford*, Baron *Percy*, &c.

20.2.08.

My LORD,

YOUR natural inclination to encourage arts, makes me preſume to lay this treatiſe of CARPENTRY, at your Lordſhip's feet; hoping it not unworthy your patronage, ſince it's a part belonging to architecture. As this branch of building has never been uſefully treated of, I have endeavour'd to explain it ſo as to render it uſeful: Therefore nothing more is wanting to recommend it to the world, and ſecure it from malice and envy, but the protection of ſo noble and worthy a Patron. I am, with the greateſt reſpect,

My LORD,

Your Lordſhip's

Moſt Obedient,

And Dutiful Servant,

FRANCIS PRICE.

TO THE

READER.

THE recommendation which I obtain'd to my firſt labours, and the kind reception it thereby met with from the publick, cauſed me to go through this ſubject again.

Having been importuned by many to add ſomewhat more thereto, whenever a ſecond edition ſhould be required, therefore to oblige ſuch, as well as the publick in general, I have ſeriouſly peruſed the firſt impreſſion, to which are herein added many things particularly uſeful; and that the whole might be made worthy its recommendation, no pains has been ſpared.

Note, *As great care has been taken to inſert ſuch things only as have been experienced; therefore it may be preſumed I ſhall give no offence, by calling this ſecond edition, The* BRITISH CARPENTER.

IN-

INTRODUCTION.

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AS *all buildings are compoſed of three principal parts,* viz. ſtrength, uſe *and* beauty, *therefore* CARPENTRY *naturally comes in among the eſſential heads of* architecture. *It is an art that has been taken notice of, by all the moſt famous architects; therefore theſe and the like circumſtances, prompted me to compile the moſt approv'd methods of connecting timber together, for moſt of the various uſes in buildings, with the rules neceſſary to be obſerved therein; but when I conſidered ſuch a treatiſe might not give a ſufficient variety, therefore it appeared neceſſary to add ſeveral other things appertaining to the art, in order to make the whole particularly uſeful.*

I have uſed my utmoſt endeavours to render this treatiſe not only intelligible to Carpenters, *but at the ſame time to be of uſe to the ingenious* Theoriſt *in* Building; *and have digeſted it in ſuch a manner as to need little or no explanation, otherways than carefully inſpecting the* PLATES.

Nevertheleſs, it may not be improper, in this place, to mention ſome general Obſervations. There is a moiſture in all timber; therefore all bearing-timber ought to have a moderate camber, or roundneſs: For 'till that moiſture is in ſome ſort dry'd out, the ſaid timber will ſag with its own weight; and that chiefly is the reaſon, girders are truſſed and uſed, as in its place will be ſhewn. But here obſerve, that girders are beſt truſſed when they are firſt ſawn out, for by their drying and ſhrinking, it tightens the truſſes in them yet more.

Obſerve alſo, that all beams, or ties, be cut, or forced in framing, to a camber, or roundneſs, ſuch as an inch in the length of eighteen feet; and that principal rafters be alſo cut, or forced up to a camber, or roundneſs, as before: The reaſon of this is, all truſſes, though ever ſo well framed, by the ſhrinking of the timber, and weight of the covering, will ſag, and ſometimes ſo much as to offend the eye of the beholder; ſo that by this preparation your truſs will ever appear well.

Alſo obſerve, that all caſe-bays, either in floors or roofs, do not exceed twelve feet if poſſible; that is, do not let your joiſts in floors, your purloins in roofs, &c. *exceed twelve feet in their length, or bearing; but rather let the bearing be eight, nine, or ten feet; which ſhould be obſerv'd in forming a plan.*

Alſo in bridging-floors, do not place your binding or ſtrong-joiſts above three, four or five feet a-part; and that your bridgings or common-joiſts are not above ten or twelve inches a-part, that is, between one joiſt and the other.

Here alſo obſerve, never to make double tenants or tenons for bearing uſes, ſuch as binding-joiſts, common-joiſts or purloins; for, in the firſt place, it weakens very much whatever you frame it into; and, in the ſecond place, it is a rarity to have a draught in both tenons, that is, to draw your joint cloſe by the pin; for the ſaid pin, by paſſing through both tenons, (if there is a draught to each,) muſt bend ſo much, that without the pin be as tough as wire, it muſt needs break in driving, conſequently do more hurt than good.

I hope theſe obſervations will not be ill taken, my meaning being to make ſuch only as are of general uſe.

N. B. *All the* PLATES *marked thus* *, *are to ſhew, that at my firſt compiling this treatiſe, I intended no more than thoſe without the ſaid mark; but ſince, receiving better encouragement than I could at firſt expect, I conceived it neceſſary to join thoſe* PLATES *to render the whole complete.*

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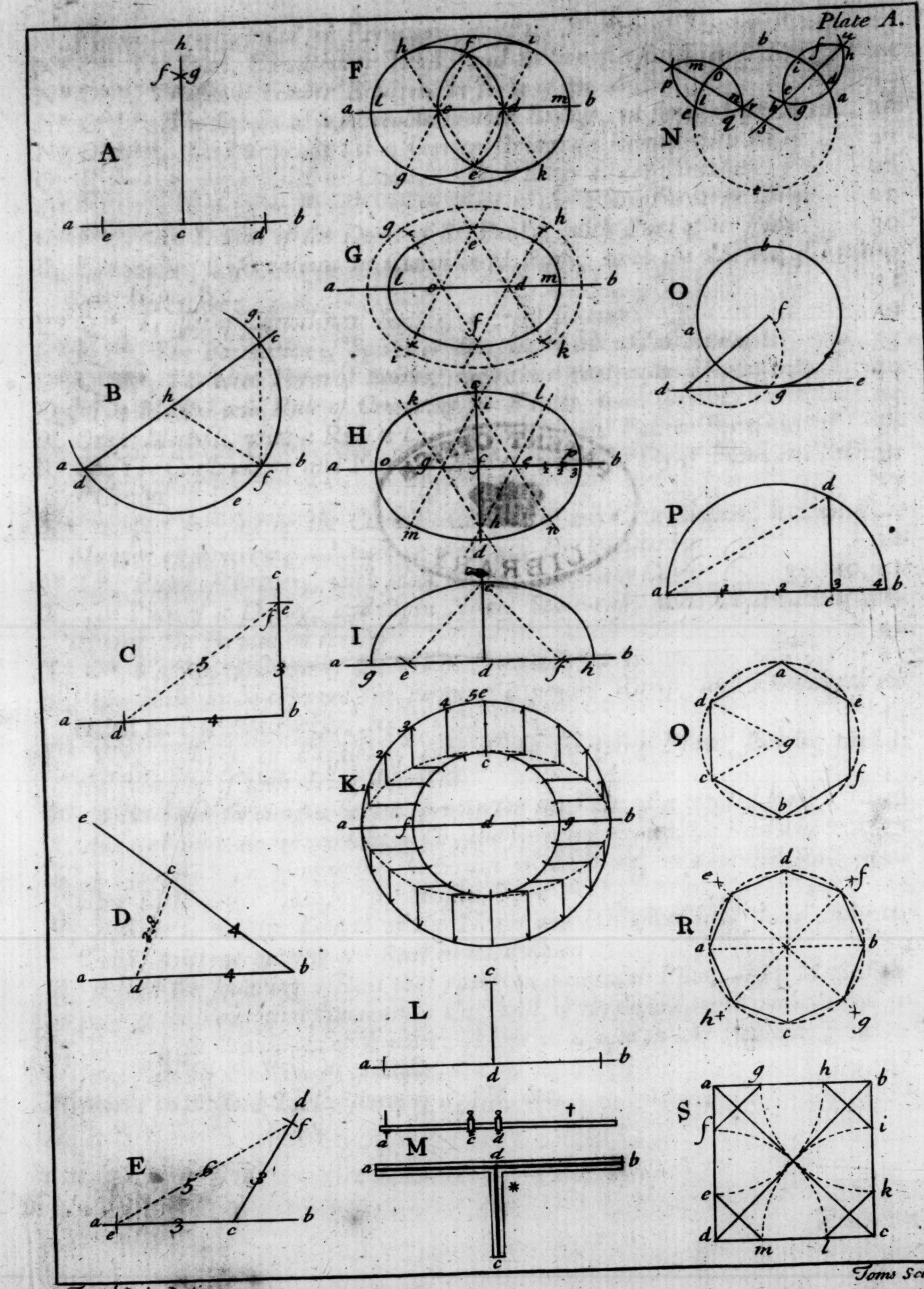

Fran. Price Delin   *Toms Sculp.t*

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PLATE A.

AS none of the following branches of carpentry can be truly performed without ſome knowledge of geometry, I therefore begin with a few uſeful propoſitions, and ſuch only as ſeem neceſſary to render the underſtanding of this treatiſe more familiar.

Prop. A. *To erect a perpendicular on a right line given.*

Let a, b, be the line. At the point c, place one foot of your compaſſes, with which, being opened at pleaſure, make the two touches e, and d. Open your compaſſes yet wider; ſet one foot in d, make the ſection g; place one foot in e, make the ſection f. Laſtly, from the point c, and through the interſection of f, and g, draw the line c, h; which is perpendicular to the line a, b, that was given.

Prop. B. *To erect a perpendicular at the end of a line.*

Let a, b, be the line, and f, a point given; take your compaſſes, place one foot in f, the other at pleaſure, as in h. Remove that foot from f, to a part of the baſe it cuts, as in d. Draw a line through thoſe two points d, and h, long enough. Laſtly, with your compaſſes deſcribe the arch d, e, g, from the point h; obſerve where it cuts the ſlope line, as at c, and draw the line from the point f, and through the interſection, as at c; which is perpendicular to the baſe given.

Prop. C. *To erect a perpendicular at the end of a line, another way.*

Let a, b, be the line, and b, its point given, or end. With a five-foot rod ſet off from b, to d, four feet, and from b, to e, three feet. Laſtly, from d, to e, ſet off five feet. At the interſection of e, and f, and to the point b, draw the line b, c; which is perpendicular to the line given. This is uſeful to every one concern'd in building; and may be done by eight feet, ſix feet, and ten feet; or by ſixteen feet, twelve feet, and twenty feet, each being proved by what geometricians call the powers of numbers; and is thus: Four times four is ſixteen, and three times three is nine, which added together makes twenty five; and ſo is five times five, twenty five; that is, the ſquares of the baſe and perpendicular, of all right-angled triangles, added together, are equal to the ſquare of the hypothenuſe.

Prop. D. *An acute angle being given, to take the ſame.*

Let a, b, be a line given, and b, e, the line that makes the angle. Then take from your ſcale the length of four feet, and place it on the line a, b, at d, and on b, e, at c. Then take the diſtance between thoſe two points d, c, which here ſuppoſe two feet eight inches. This method will take the angle.

Prop. E. *An obtuſe angle being given, to take it.*

Let a, b, be ſome line, and c, d, the line making the angle. From c, place three feet, as at e; alſo from c, place three feet, as at f. Laſtly, from e, to f, take the diſtance, which here is five feet ſix inches.

Prop. F. *To deſcribe an oval to a length given.*

On a line, as a, b, place the length l, m; divide it into three equal parts; with one, as c, d, make the two circles; their interſections give the place of the curves meeting, and alſo centers, by which deſcribe the oval g, h, i, k.

Prop. G. *To deſcribe an oval to a length or width given.*

On a line, as a, b, make two equilateral triangles, not exceeding the width of the oval, as c, d, e, and c, d, f, whoſe ſides continued give the centers and places of the ſections meeting, ſo that you may deſcribe an oval to either the length or width, as g, h, i, k.

Prop. H. *To deſcribe an oval to any length or width given.*

On a line, as a, b, limit your length, as o, p; alſo your width, as c, d. Take the width c, d, in your compaſſes; place one foot in o, obſerve how far it cuts on the baſe, as at e; divide the diſtance from e, to p, into three epual parts; with two of them, placed on each ſide the center f, make two equilateral triangles, as g, e, i, and g, e, h; whoſe ſides being continued, give

give the centers and places of the ſections meeting, by which you deſcribe the oval k, l, m, n. This is of general uſe; but more particularly to maſons, and bricklayers, for in arches thus deſcrib'd they have occaſion but for two moulds.

Prop. I. *To deſcribe an oval to any length and width, by another method.*

On ſome line, as a, b, limit the length of your oval, as g, h; alſo limit your half width (or height) d, c. Take half the length, as, g, d; in c, place one end of your length; obſerve where that length g, d, cuts the baſe, as in e, or f; drive a nail in each point: Then with a ſtring you may deſcribe the oval deſired.

Prop. K. *To deſcribe an oval by the meeting of lines.*

On ſome line, as a, b, make a circle the length of your oval, as a, e, b; alſo make a circle the width of your oval, as f, c, g; divide either into a number of equal parts, as here into twenty; lay a ſtreight rule from the center to each of theſe parts; let it touch the periphery of the other circle, by which it is divided into twenty parts alſo. Draw lines parallel to the baſe, from the circle for the width; and alſo, perpendiculars from thoſe diviſions on the circle for the length. The meeting of them forms a compleat oval, as a, c, b.

Prop. L. *To deſcribe an oval more particularly uſeful than any of the forgoing methods, with a trammel.*

Let a, b, repreſent the length of an ellipſis or oval, and d, c, half the width or height of the ſame ellipſis or oval.

Let the form of the trammel be Fig. M.

Let † be the rod of a trammel, and * the groove or ſtock of the ſame: Take the groove *, and fix the middle thereof, as a, b, on the baſe line given in L; alſo obſerve that the groove d, c, in *, be over the line d, c, in L. Laſtly, having two pieces like the head of a gage to ſlip on †, and faſten at pleaſure, the bottom of which is made a pin, the exact bigneſs of the groove in *, on †, let a, be a pencil fix'd; take the

the half width of your oval in L, as c, d, and place the moving head c, †, to the ſame diſtance, as a, c; take alſo your half length from L, as a, d; which place from a, the pencil in †, to d, the other moving head, as a, d; each being fix'd, move the rod †, in the groove *: So will the pencil a, form the true curve deſired. An ellipſis ſo form'd, is agreeable to a circle in any poſition: Such as groins, or angle brackets, without tracing.

Prop. N. *Part of a circle being given, to form the whole.*

Let a, b, c, be part of the circle given. With your compaſſes opened at pleaſure, place one foot on the curve given in d; deſcribe the ſection e, f. Place one foot, as in i; deſcribe the ſection g, h. Remove your compaſſes, place one foot in l, deſcribe the ſection m, n; place one foot in o, deſcribe the ſection p, q. Laſtly, through the interſections draw the lines k, u, and r, p, that meet in s; it is the center by which you may deſcribe the circle. This ſeldom falls out to be uſed, but is in fact the ſame as bringing three points given, which are not in a right line, into a circle.

Prop. O. *A circle and tangent line given, to know its point of contact or touch.*

Let a, b, c, be the circle given, and d, e, the ſaid tangent line. From the center f, to any part of the tangent line, draw a line at pleaſure; on which line form a ſemi-circle to its extent, and obſerve where it paſſes through both, as at g; for that is the point of contact or touch.

Prop. P. *Shewing how to increaſe or decreaſe a ſcale to any proportion deſired.*

Let a, b, repreſent one foot or ten feet of a ſcale by which a drawing has been perform'd: Let the ſame drawing be demanded to be contracted, ſo as to contain one fourth, or one half, or three fourths of the ſame bigneſs in its ſuperficies. If three fourths, divide the line a, b, into four equal parts, and at 3 raiſe the perpendicular c, d; obſerve where it paſſes through the circle firſt made on the line: So from a, to d, is a ſcale of one foot, or or ten feet, which will be in the proportion deſired; and from d, to b, will be a ſcale one fourth as big; that is, your drawing, when perform'd by either of theſe ſcales, will be in the proportion propoſed.

PROP. Q. *To divide a circle into ſix equal parts, or any number in progreſſion generated by ſix.*

Let a, f, c, be the circle given; its radius, or ſemi-diameter, g c, or g d, will divide it into ſix equal parts, as d, a, e, f, b, c; by ſubdividing each into two, you have it in twelve; if into three, eighteen; if into four, then your circle will be in twenty four; and ſo on.

PROP. R. *To divide a circle into eight parts, or any number in progreſſion generated by eight.*

Let a, b, c, d, be a circle given to be divided into eight equal parts. Firſt draw the diameter through the center, as a, b; at right angles draw the diameter c, d, alſo through the center; that divides the circle into four equal parts; then by ſubdividing each into two, your circle is divided into eight equal parts, a, e, d, f, b, g, c, h; by ſubdividing each again into two, you divide the circle into ſixteen equal parts; and if again into two, then your circle will be in thirty two equal parts; and ſo on.

PROP. S. *To form an octagon within a geometrical ſquare.*

Let a, b, c, d, be the ſquare given. Draw the diagonal line a, c, alſo the diagonal b, d; place one foot of your compaſſes, or, if required, one end of a rod, in a; make the ſection e, h, with half the diagonal, and remove to b; make the ſection g, k; then remove to c; make the ſection m, i; remove to d; make the ſection f, l. Laſtly, draw lines from f, to g; and from h, to i; and from k, to l; and from m, to e; ſo is e, f, g, h, i, k, l, m, the octagon required. And this is ſo uſeful, that every artificer in building ought to be acquainted with it.

PLATE

PLATE B.

BECAUSE it is uſeful, I have ſhewn the manner of ſcarfing, or piercing of timber together.

In a, and b, are ſhewn joynts for plates, lintels, or timber for tyes; and if for beams, add the bolts, as repreſented in the figures.

Where more ſtrength is required, ſee c, d, e, f; which laſt may be done without waſting any of the length of your timber; that of d, is ſuited for an extraordinary uſe; for by its being in two thickneſſes, it may be made as ſtrong in a manner as tho' in one piece. I do not propoſe to limit the length of theſe joynts, but only to ſhew their form of being framed or ſabled together.

In g, h, i, is ſhewn the manner of truſſing girders that are to bear above twenty four feet.

Firſt cut out two pieces of timber, which together make the ſcantling propoſed, with ſome good, dry, and ſtrait-grain'd *Engliſh* oak, of four inches by three, or ſix inches by four, as the nature of the thing ſhall require. Let half into one piece, as in g, at l, m, n, as tight end-ways as it's poſſible to drive them in; then cut a vacancy in the other half, as h, which ſhall alſo drive on that of h, as tight end-ways at l, and m, as it's poſſible; laſtly, bolt them together, as is ſhewn above, and they are fit for uſe.

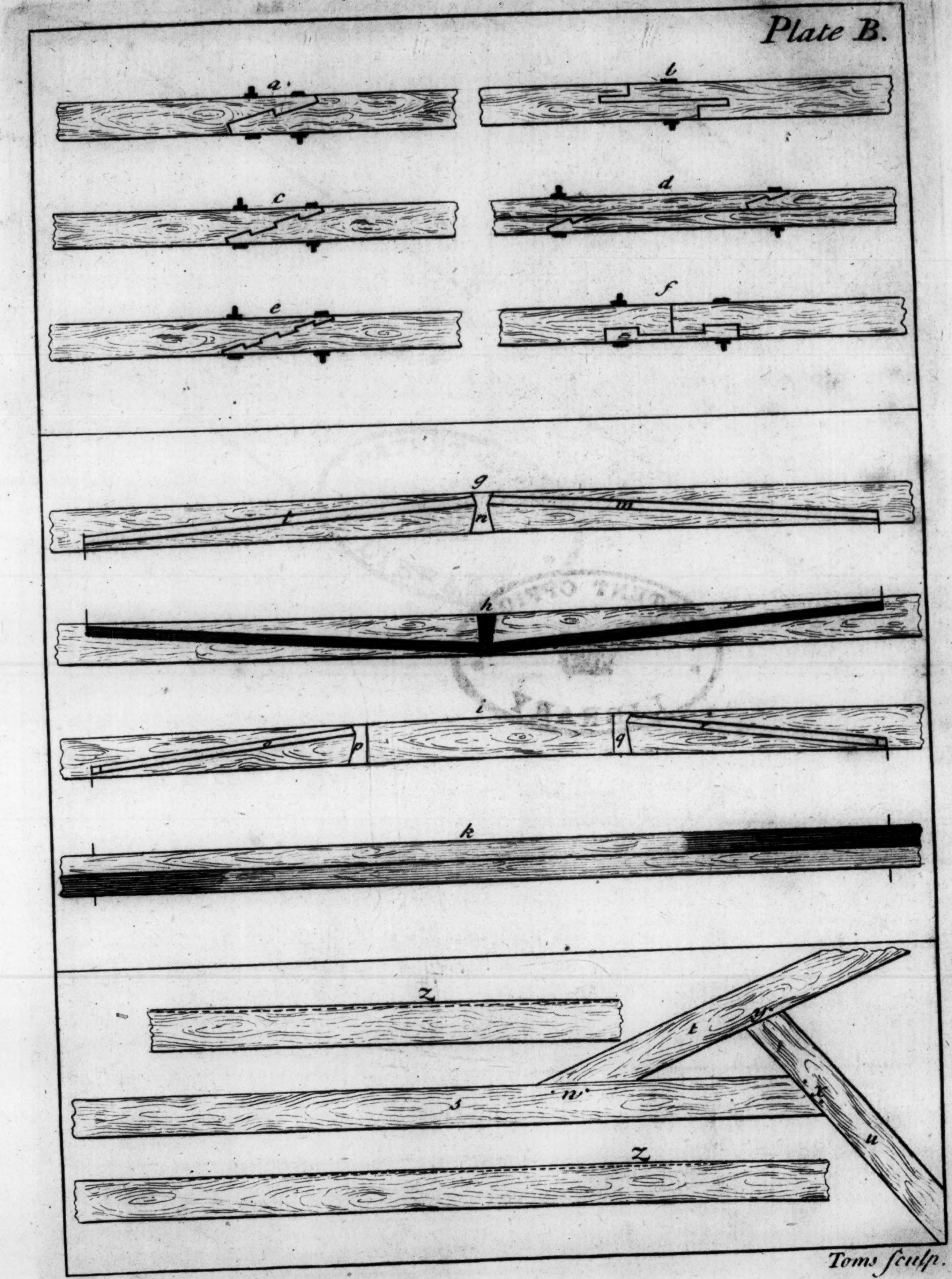
In i, is yet a ſtronger method, becauſe it divides the bearing into three equal parts.

As before, let in the pieces o, p, q, r; and at the foot of o, and r, you may mortice through both flitches, by which you may with a wedge, tighten the ſaid girders, when the building is cover'd in, which conveniency is worthy of the ſtricteſt regard, and requires to be well perform'd.

In k, is the way propoſed or taught by *Leon Baptiſt Alberti*. Take two pieces or flitches, being well dryed, and turn the but-end of the one, to the top-end of the other without truſſing at all, and bolt, or ſcrew them together; the ſhort lines, at the ends of the truſs, repreſent the walls to bear them when done.

In the lower part of the Plate, is ſhewn how timber may be uſed, that is not long enough, and muſt be camber'd at w, x, y; that is, each of the pieces t, u, and s, as is ſhewn by z, z.

Plate B.



Toms sculp.

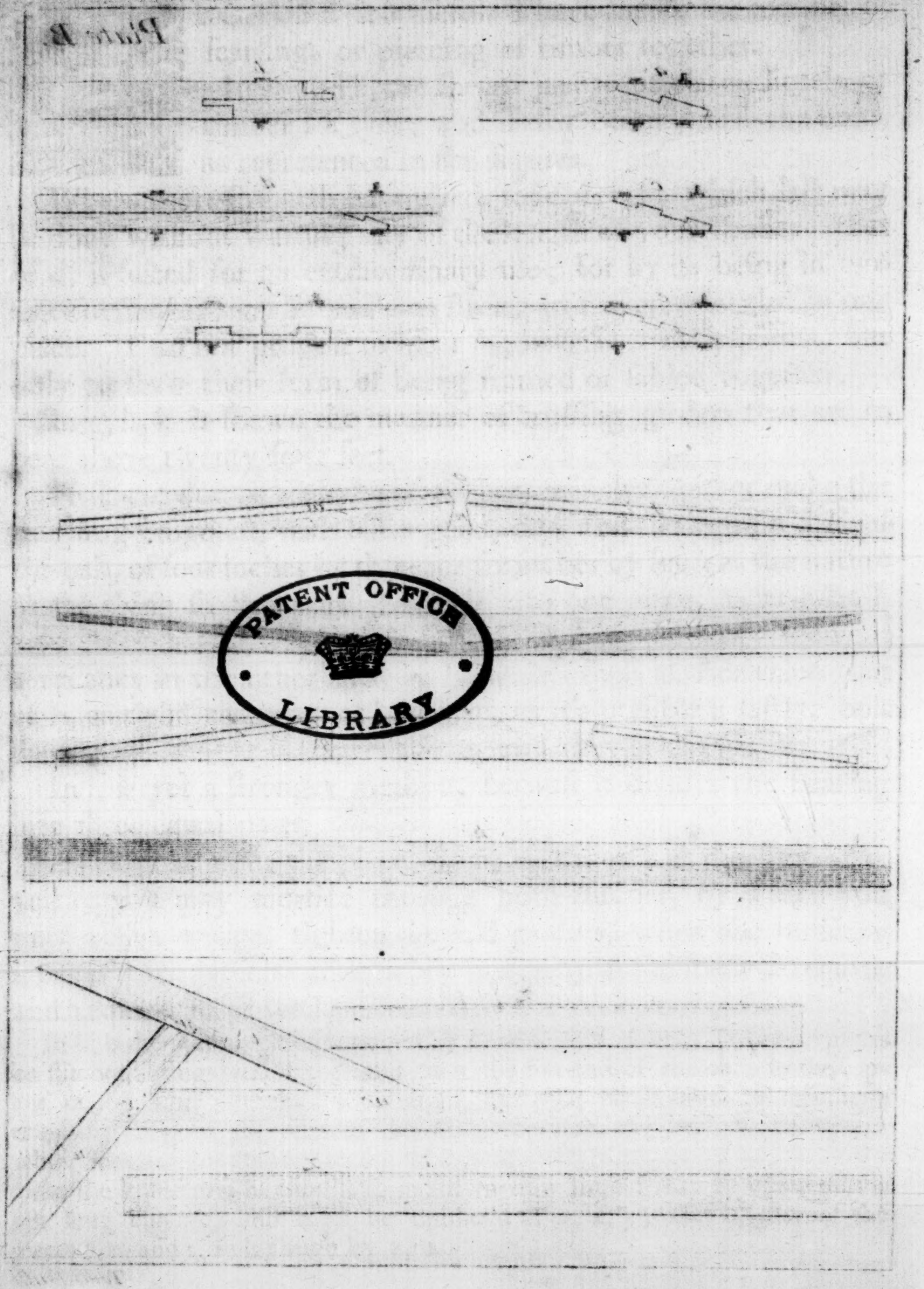
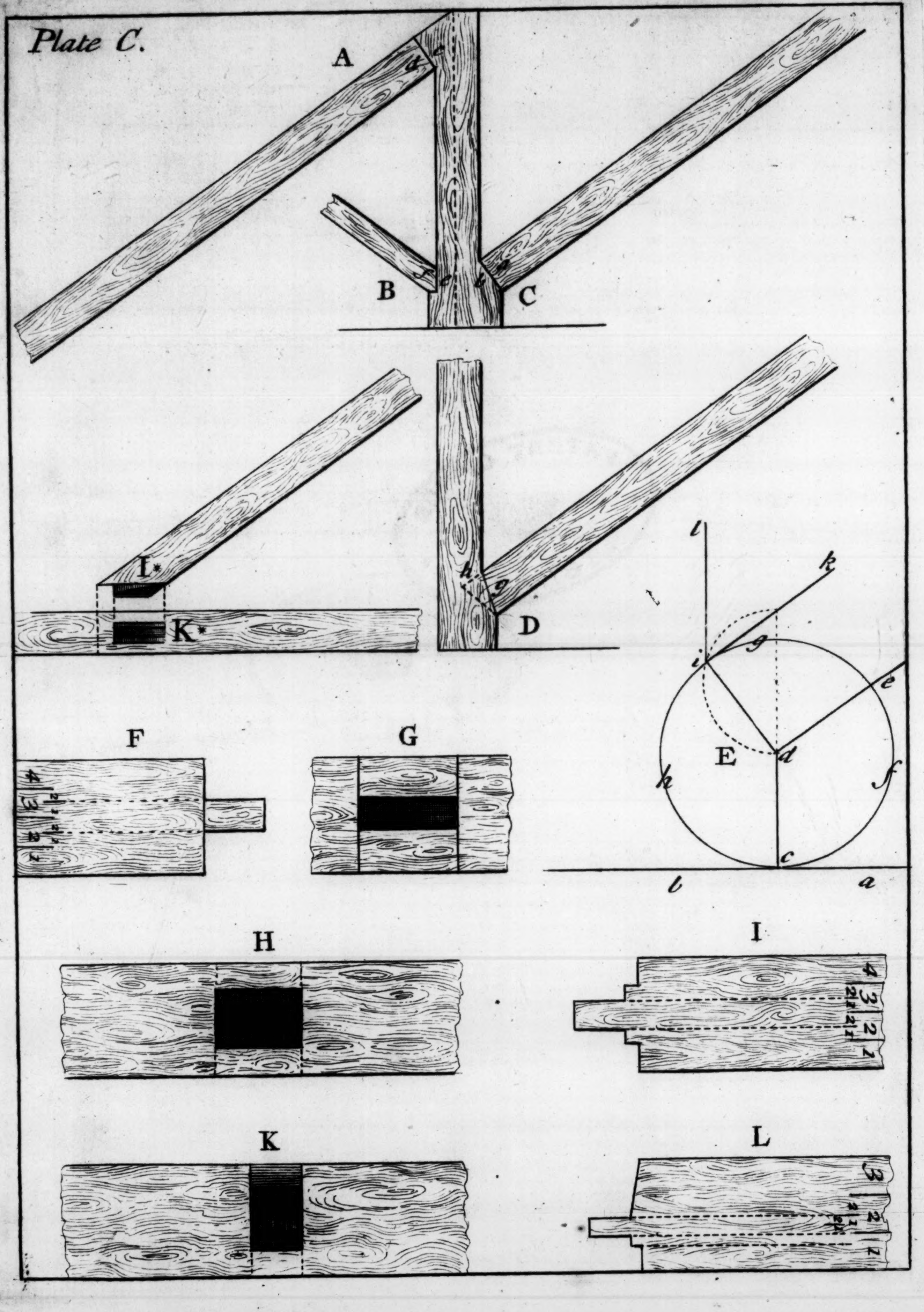


Plate C.



CONSIDERING how uſeful the way of framing timber together may be, to ſome of my readers, I hope this Plate may not be unſeaſonably applied, ſince none of the following parts can be perform'd without a juſt knowledge of it.

At A, is the joynt of a principal rafter, as d; fram'd into the top of a king poſt, as c; and is generally framed as F, G.

At B, is the joynt of a ſtrut or brace, as f, fram'd into the bottom of a king poſt, as e; and may be framed as F, G: This is when timber is ſcanty; or elſe the beſt way is at C, becauſe a ſquare joynt takes the full force of the weight; let b, be the king poſt, and a, the ſtrut or brace, and framed as F, G.

In D, is ſhewn a different manner, for variety, and may be framed as H, I; becauſe then the butment on the ſide of the tenon may be cut, as the prick'd line h; tho' the joynt next the eye, be as appears at g.

In E, is ſhewn a true way to make a proper joggle on a king poſt, *&c.* Let a, b, repreſent the top of a beam, and c, d, the bigneſs of a brace, to be uſed; with c, d, form a circle, as h, g, f; from the point d, ſet the ſlope of the brace, as d, e; alſo its bigneſs, as from i, to d, and from k, to e; by PROPOSITION O, find the point of touch, i; ſo is i, l, the ſide of the king poſt.

Let K*, repreſent a beam, and I*, a principal rafter: It is to be framed as H I; for then the butments give it a greater ſtrength.

In F, and G, is ſhewn the proportion a tenon or mortice ought to bear to the ſtuff to be made uſe of, for the aforeſaid uſes, or for partitions.

In H, and I, is the proportion for the tenon or mortice for the uſe obſerv'd above.

In K, and L, is ſhewn the proportion the tenons and mortices of floors ought to bear to the depth of the ſtuff to be uſed; and here it may not be amiſs to obſerve, that I do not inſiſt it ought to be exactly ſo, but at the ſame time, the nearer the better.

PLATE C*, D*.

CONSIDERING difficulties often ariſe, from placing timber different ways, it is neceſſary to obſerve how they are to lie, and alſo how they ſhall be framed.

Therefore, here is the plan of a houſe in which is ſhewn, by the pricked lines, the beſt way of placing your principal timbers, ſo as to lie firm, that is, not to lay them over doors or windows, nor too near chimneys, and at the ſame time to have the boards lie all one way, which is generally the way that you have the beſt viſtoe; as M*, N*, O*.

Becauſe I would not confuſe the plan, by ſhewing the manner in which the floors are to be framed, therefore obſerve the floors of three rooms; as P*, Q*, R*.

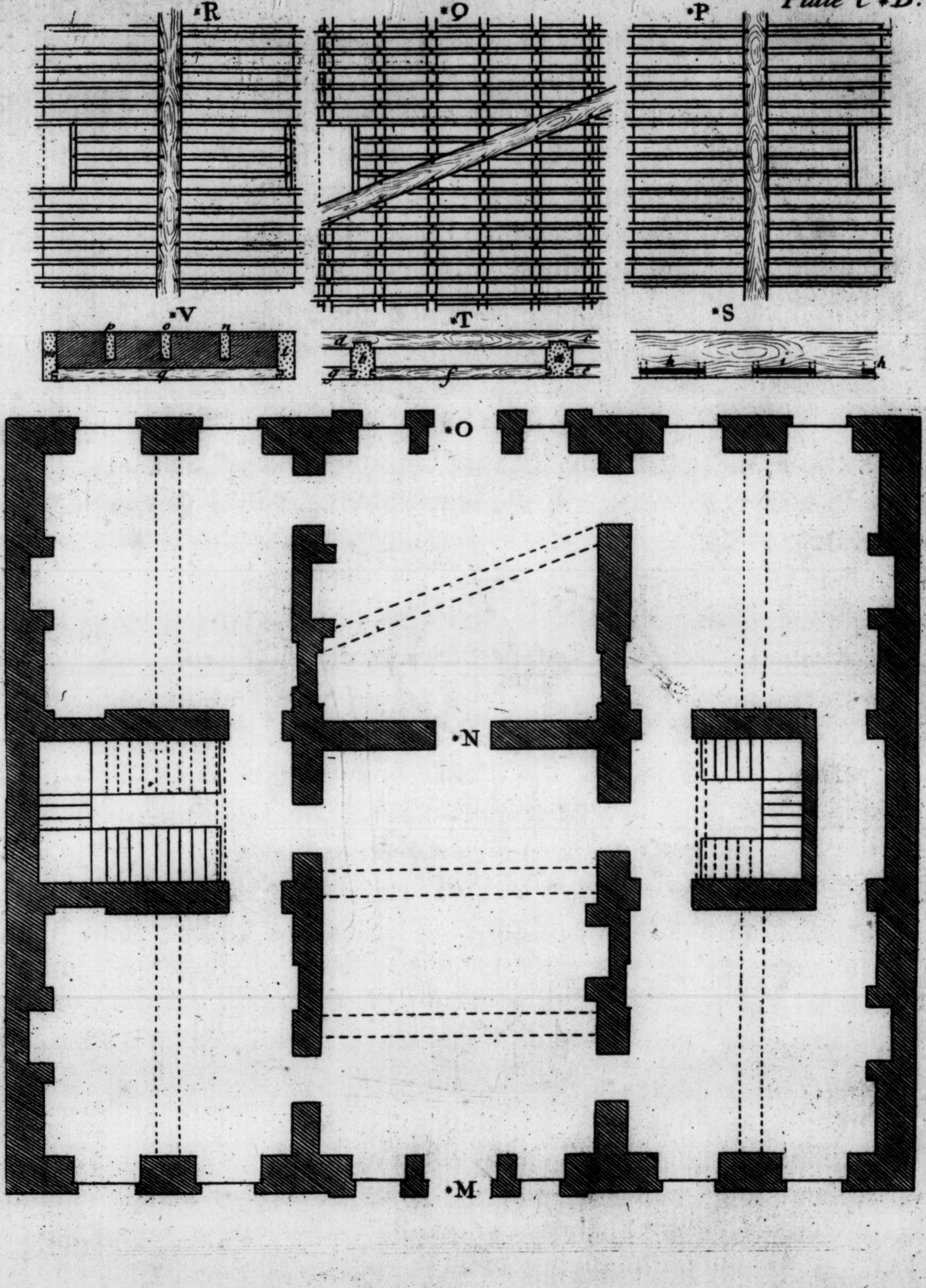
That of Q*, is call'd bridging floors, as being framed with a binding, or ſtrong joiſt, in every three or four feet diſtance, and fluſh to the bottom of the girder; ſo that when the houſe is cover'd in, you pin down your bridgings thereon, and fluſh with the top of your girder: And this is the beſt way of carcaſe flooring.

That of P*, and R*, may as well be framed fluſh to the top of the girders in each, and have every third or fourth joiſt the depth of the girder, and thoſe between more ſhallow.

In T*, is ſhewn the manner of bridging floors; a, and b, repreſenting the ends of two binding joiſts, on which is the bridging, d, c; and into theſe binding joiſts, are fram'd the cieling joiſts, e, f, g.

In V*, is ſhewn two deep joiſts of the other floors, or common way, as l, m; and alſo three ſhallow ones, as n, o, p; and alſo the cieling joiſt, q. And becauſe theſe deep joiſts, as well as binding joiſts, are ſo prepared as to put in the cieling joiſts, when the houſe is cover'd in, obſerve in S*, the ſuppoſed ſide of either, with the mortices for the ſaid cieling joiſts; as h, a ſingle mortice, and i, k, double, or pully mortices, (as they are call'd.)

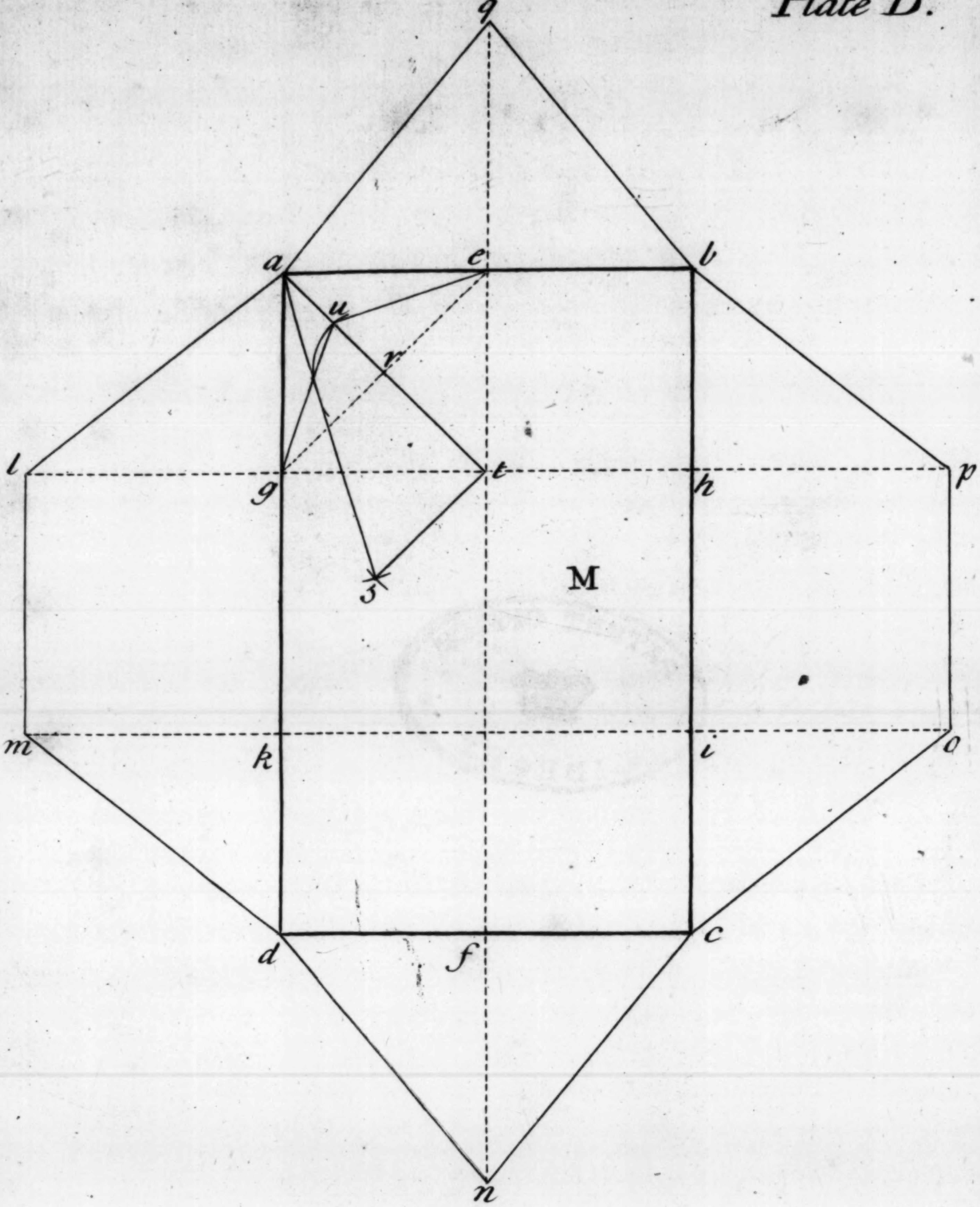
Plate C*D.

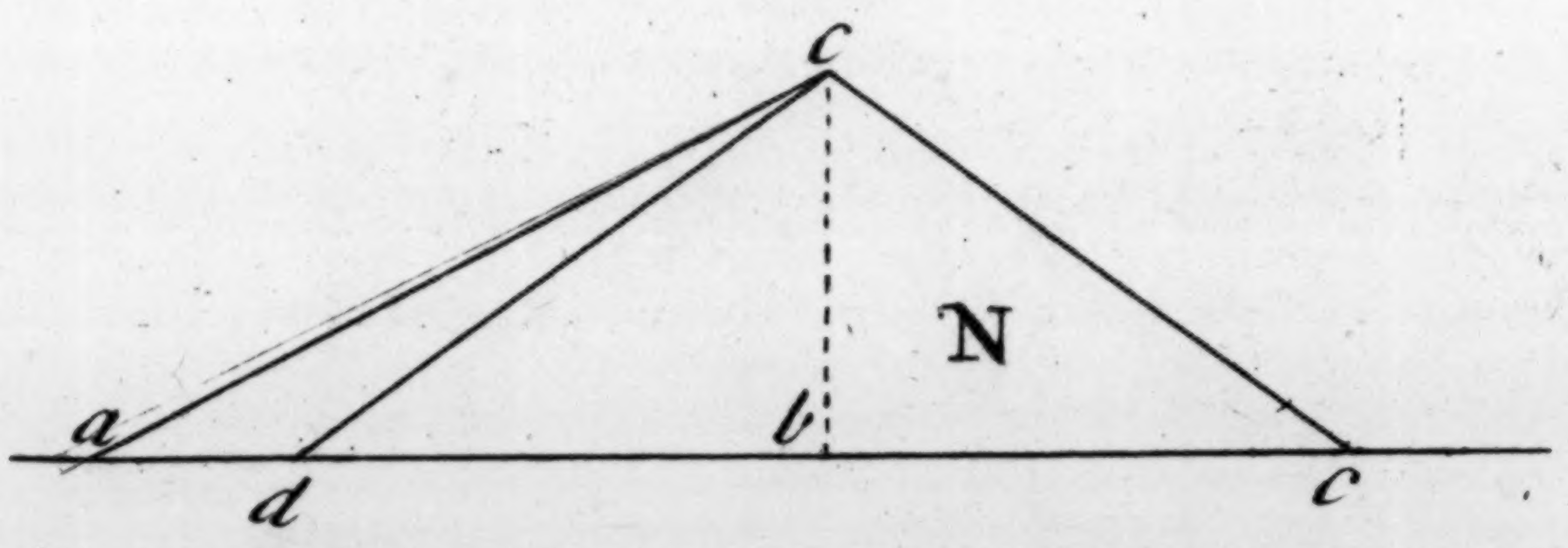


F. Price inv. et delin.

Toms sculp.

Plate D.





F. Price inv. et delin.

Toms sculp.

PLATE D.

DIRECTLY after having ſhewn how timber is to be framed together, it appear'd neceſſary to obſerve how roofs are to be form'd, and in which I have uſed, with a little variation, what is ſaid to be Mr. *Pope*'s method.

Let M, be a plan to be incloſed with a hipp'd roof. To find its ſkirts; firſt, form ſome ſlope, or pitch, as at N, *which ſhall be better clear'd in the following Plates.*

Let a, b, c, d, be the plan, which divide in two equal parts, as e, f; draw that line at pleaſure, long enough; ſet the diſtance of that middle line, as from a, b, to g, h, which alſo draw long enough, at pleaſure; again, ſet the ſame diſtance off, as from c, d, to i, k, and draw that line alſo at pleaſure; this done, apply to N, where d, c, or c, c, each alike are the length of the rafter, which ſet off, as from e, to q; and from h, to p; and from i, to o; and from f, to n; and from k, to m; and from g, to l.

Apply to N, take the length of the hip a, c; which is found by taking the baſe of the hip in M, as a, t; and ſet it off in N, as from a, to b; which length is the ſame as was given by limiting the length of your rafter on each prick'd line; ſo that, your ſkirt is a, q, b; and b, p, o, c; and c, n, d; and d, m, l, a.

To find the back of the hip. Make the angle a, t, s, in M, from a, b, c, in N; draw the line g, e; place one foot of your compaſſes in r; extend the other to the neareſt diſtance, it will touch the hip a, s; with that diſtance, make a ſection; obſerve where it cuts the baſe, as in u; ſo that g, u, e, is the back of that hip.

This is the method given by Mr. *Pope*, for either ſquare or bevel roofs, either above pitch or under.

PLATE E.

EVERY man may judge that bevel buildings ought to be avoided if poſſible; but as it frequently happens otherways, ſee the plan O, whoſe angles are unequal.

Let a, b, c, d, be the angles of the plan. Firſt, take the middle of it, as e, f; with that diſtance, draw from r, to e, and ſquare to the end a, b, draw through the line g, h; alſo place that diſtance, from s, to f; and ſquare from one end, as before, draw through, at pleaſure, the line i, k. This being done, ſhew ſome pitch, or ſlope, as in P, at h, r, g, which is the pitch, or ſlope; h, r, or g, r, being the length of the rafter, terminate the ſame, as before.

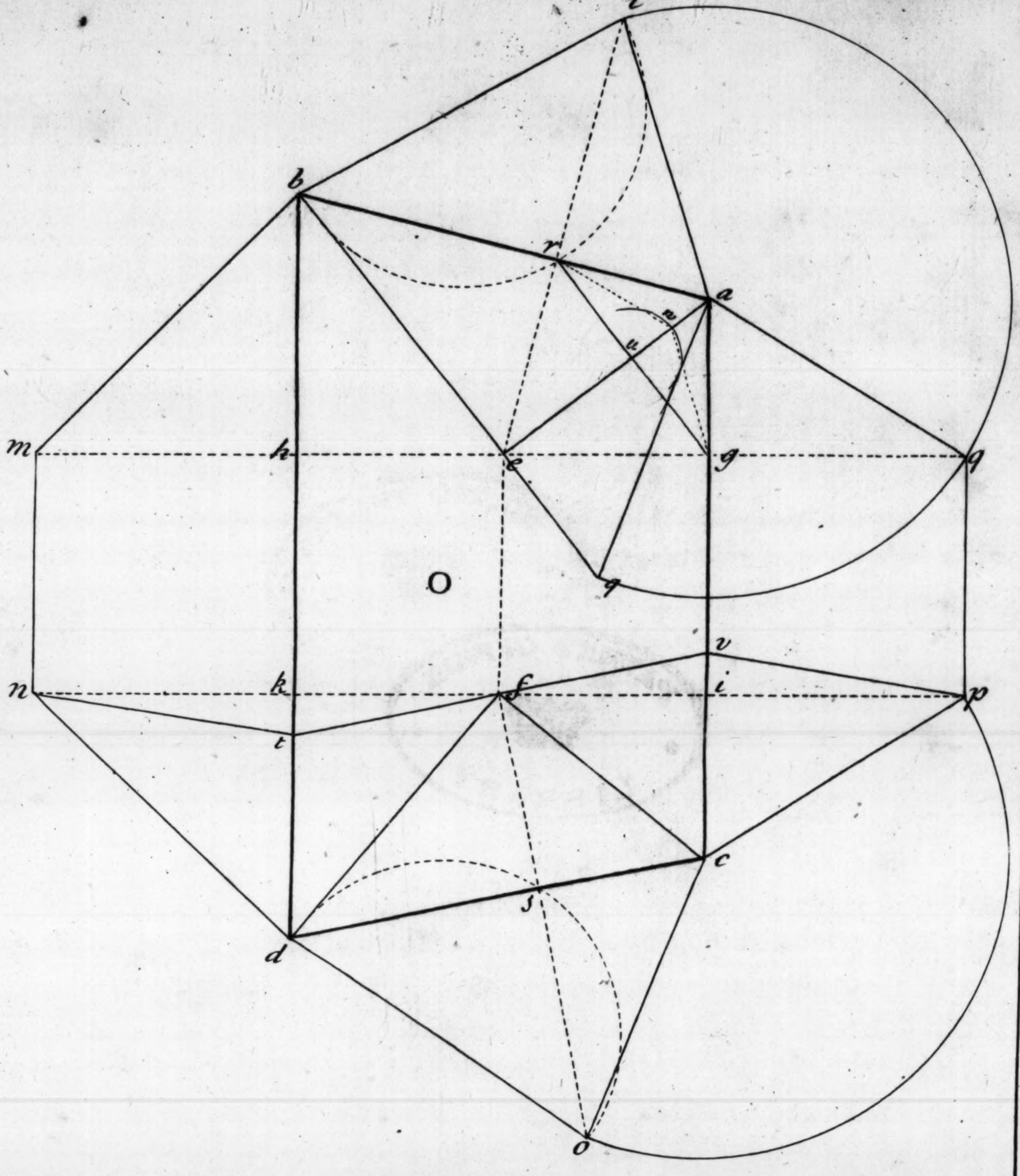
Draw the baſe of each hip in the plan O; as e, a, and e, b; alſo f, c, and f, d; which, being applied to the ſection P, ſhew the length of each hip: So that by this, or the foregoing Plate, deſcribe the skirts, a, l, b; and b, m, n, d; and d, o, c; and c, p, q, a. By propoſition B, draw the line l, r, e, being the rafter and beam, each being ſquare; as alſo that of o, s, f.

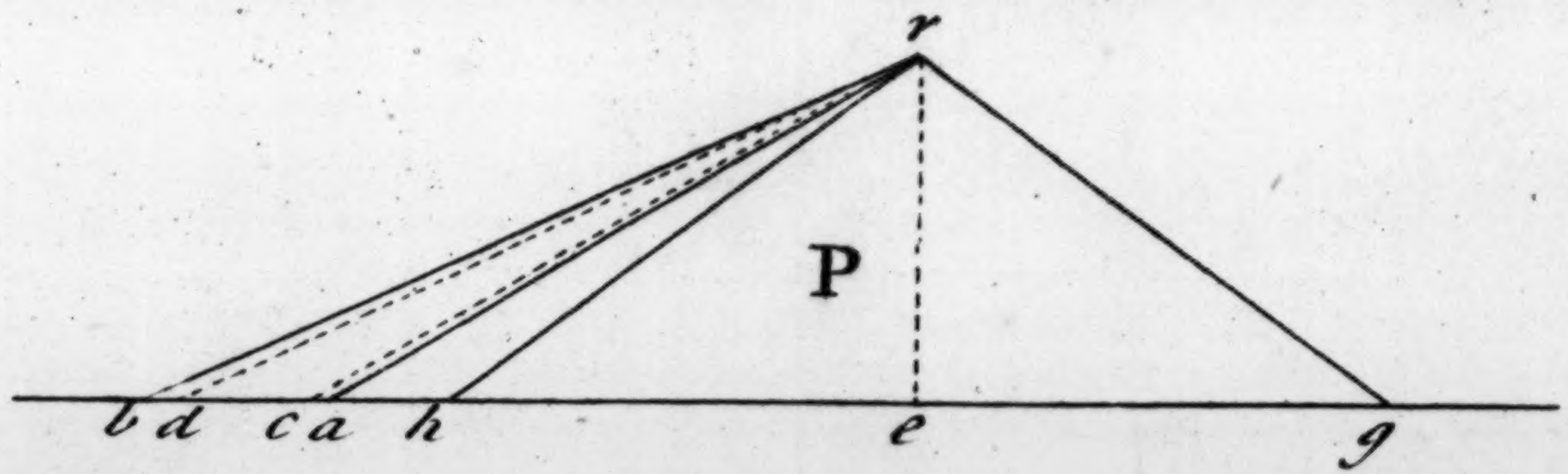
Thus by laying your beams ſquare, you have little trouble more, than if your building was ſquare; otherways than having the trouble to back each hip ſeparately; although here is only one ſhewn, the rule being ſaid to be general.

The lines n, t, and t, f, u, and u, p, are only to ſhew the trouble that attends laying the beams bevel; the large circles are only to ſhew the hips equal in length, one to its oppoſite.

To back the hips, obſerve in the plan O, a, e, q, is the hip taken from P, as before; draw the line r, g, place one foot of the compaſſes in u, extend the other foot to the neareſt diſtance, it touches the hip a, q, which ſet on the baſe, as at w; ſo that r, w, g, is the back of that hip; and ſo of the reſt, reſpectively.

Plate E





F. Price inv. et delin.

Tome ſculpt.

Plate E

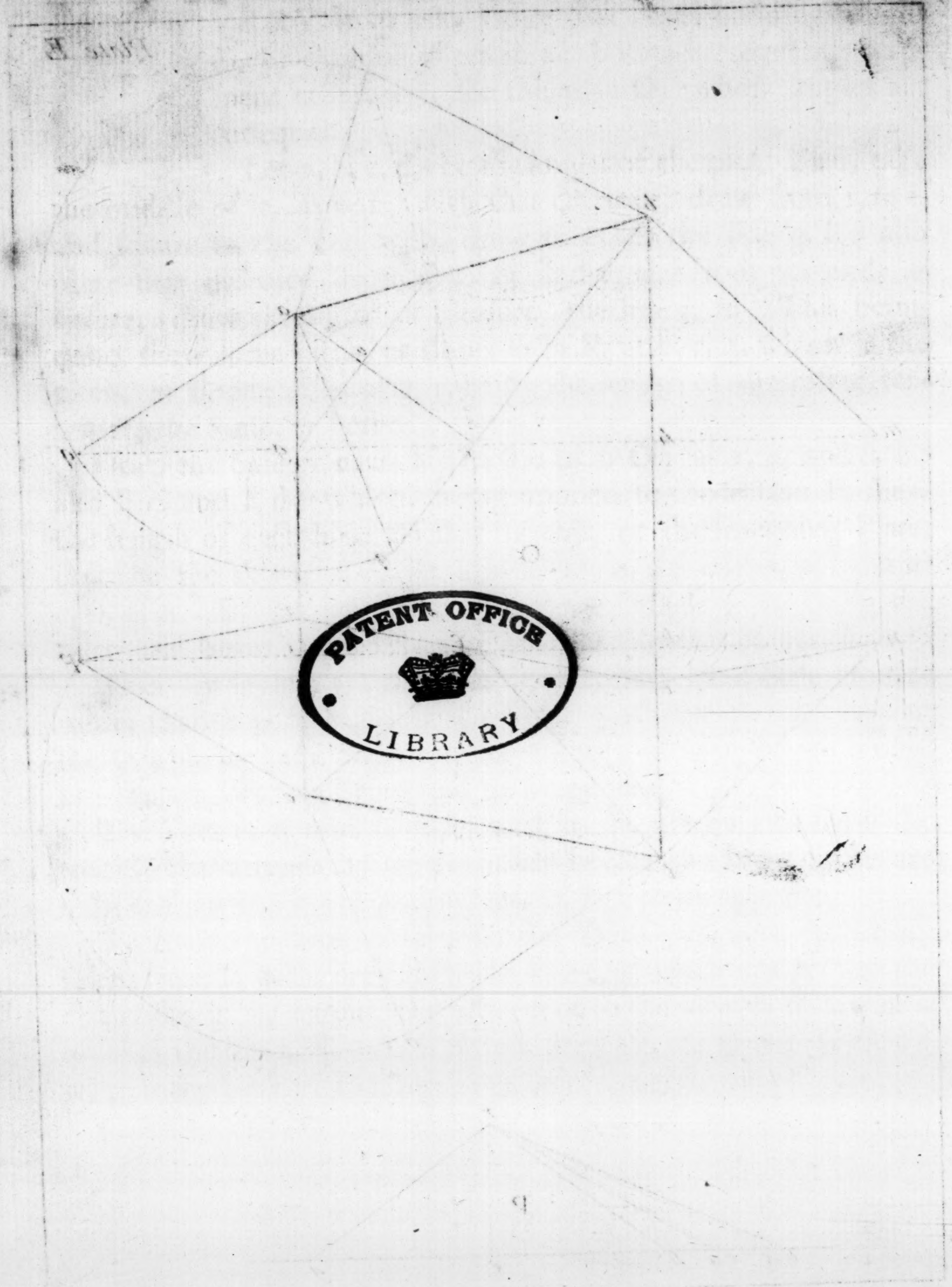
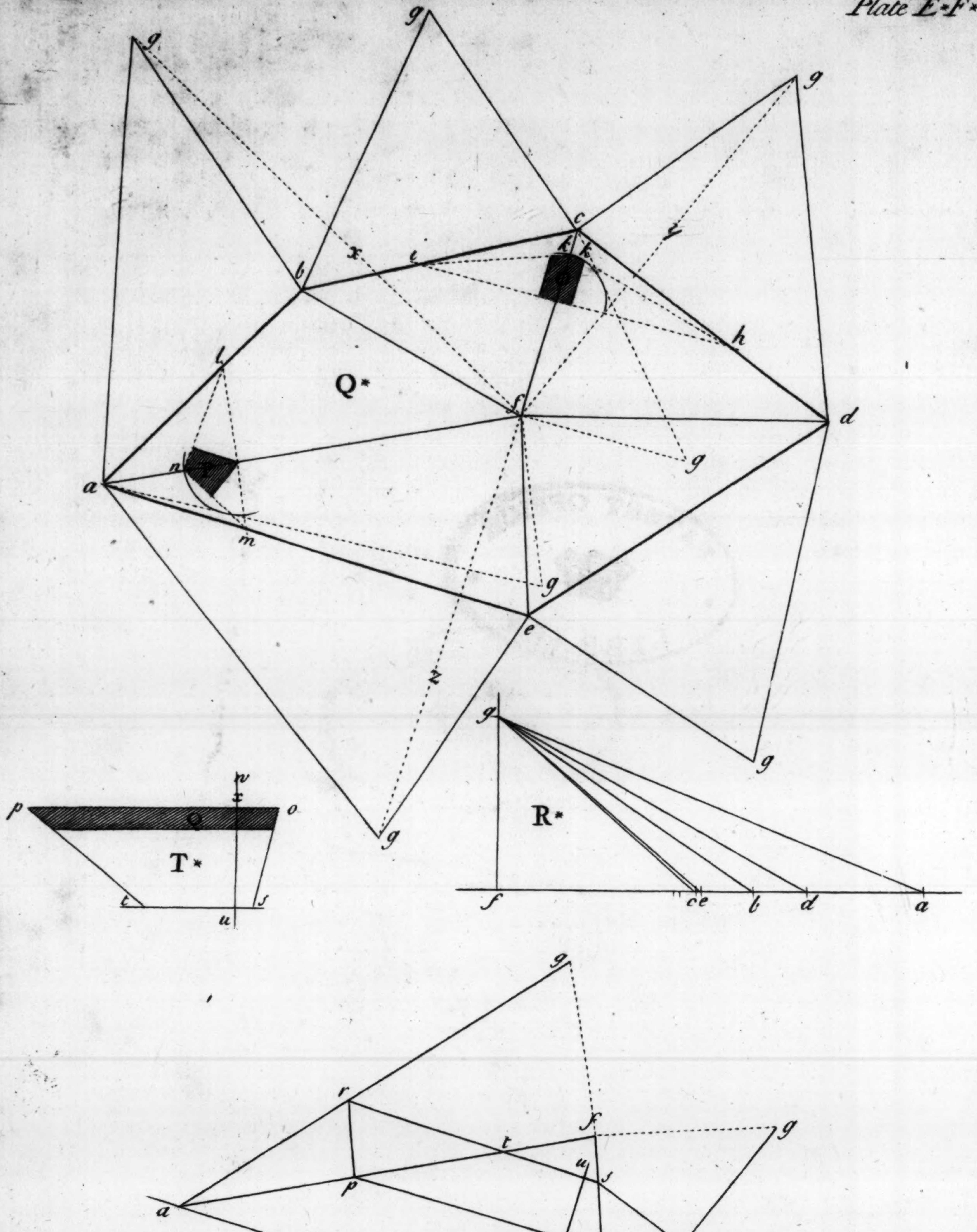


Plate E*F*



F. Price inv. et delin

Toms sculp.

PLATE E*, F*.

EVERY form of bevel roofs, may eaſily be conceived by this Plate, and leſt any objections ſhould be made to what I have hitherto ſaid on this head, I have therefore ſtrictly conſidered the nature of hip roofs and their dependants, and make no doubt of its meeting with a kind reception.

Admit the plan Q*, was required to be encloſed with a hipt roof; firſt find the middle of it, as f; then draw the baſes of your ſeveral hips, as a, f; b, f; c, f; d, f; and e, f, reſolve on ſome pitch or height, as in R*, at f, g; to this ſection bring all the baſes of your reſpective hips, as the letters of reference ſhew; this gives you the length of each reſpective hip; therefore from this ſection R*, you deſcribe the ſkirts round the plan Q*, as a, b, g; and b, c, g; and c, d, g; and d, e, g; and e, a, g; which form the roof required.

To find the back of any hip, do thus; draw a line at pleaſure, croſſing the baſe of the hip at right angles; as the line h, i, which croſſes the baſe of the hip c, f; obſerve where it paſſes through the ſides of the plan; on the baſe line of this hip raiſe its ſection, from R*, as c, g, f; laſtly, place one foot of your compaſſes in the interſection, as at y; open the other foot, till it touch the hip c, g; at its neareſt diſtance, draw a ſmall ſection till it croſs the baſe as at k; ſo is h, k, k, i, the back of that hip; *and is the moſt exact, and eaſieſt method, that ever was delivered for this purpoſe*; the ſhadowed part O, is the ſection of the ſuppoſed timber the hip is ſhaped out of, being cut off at right angles with its ſide and back. What is ſaid of this explains the hip a, f; whoſe back is l, m, n; and its ſection P, is ſhaped ſo as to have the purlin come ſquare againſt it; the letters of reference ſhew the reſt.

To find the ſide joynt of a purlin, (in caſe the hip be not ſhaped as above) ſo as to cut it by a templet, ſuppoſing there be not room, or occaſion, to frame it into the hip; for example, take any two of the hips from the plan Q*, as e, f; and a, f; which to keep from confuſion is transfer'd as to S*, and admit the plan of the purlin to be o, p; firſt raiſe the ſections of the hips from R*, as e, f, g; and a, f, g; as the letters ſhew; then raiſe perpendiculars at o, and p, to the back of the hips, as o, q, and p, r; laſtly, draw a line from the point q; and at right angles from the back of the hip e, g; (as it is ſo near a ſquare; or elſe it ſhould be drawn from the back of a rafter ſtanding at right angles with the ſides of the plan;) obſerve where it cuts the baſe as at s; draw alſo the line s, t, parallel to the purlin; laſtly, draw the line t, r; from all which you take the templet Q, in T*, in the following manner. Draw the line u, w, in S*, at right angles from the ſide a, e, which transfer to T*, as u, w; take from S*, the diſtances, u, s, and u, t, and transfer them to T*; take alſo the diſtances x, o, and x, p, in S, and transfer them to T*; take alſo the diſtances s, g; in S*, and transfer to T*, as s, o; laſtly, take from S*, the diſtances, t, r; and transfer to T*, as t, p; ſo that Q, is the templet to cut the ſide, and the ſkirt e, a, g, is the templet to cut the back. I think any farther explanation needleſs, becauſe by a little ſerious inſpection, the reader may ſee that all the lines neceſſary to be underſtood in a roof, are contained in this Plate.

That is, all the parts of a roof may be cut by templets, as theſe lines and the explanation of them does direct; and although I have ſhewn but one example for the cutting of any purlin that comes againſt a hip, as explained in h, k, i, I hope it will be ſufficient, becauſe the method in l, m, n, cuts off all ſuch difficulties, *and is* equally as ſtrong.

The lines f, x, g, and f, y, g, and f, z, g, are only to ſhew the poſition of the ſmall rafters, *viz.* to lie ſquare from each reſpective ſide, by which means one may cut the ſtuff out ſquare, and avoid the difficulty of cutting them bevel; which caution may ſerve as a rule, in caſe the principal timbers be confined to lie bevel, or not at a right angle from the ſide.

PLATE F.

FOR variety ſake here is repreſented a floor, and roof, lying in ledgement.

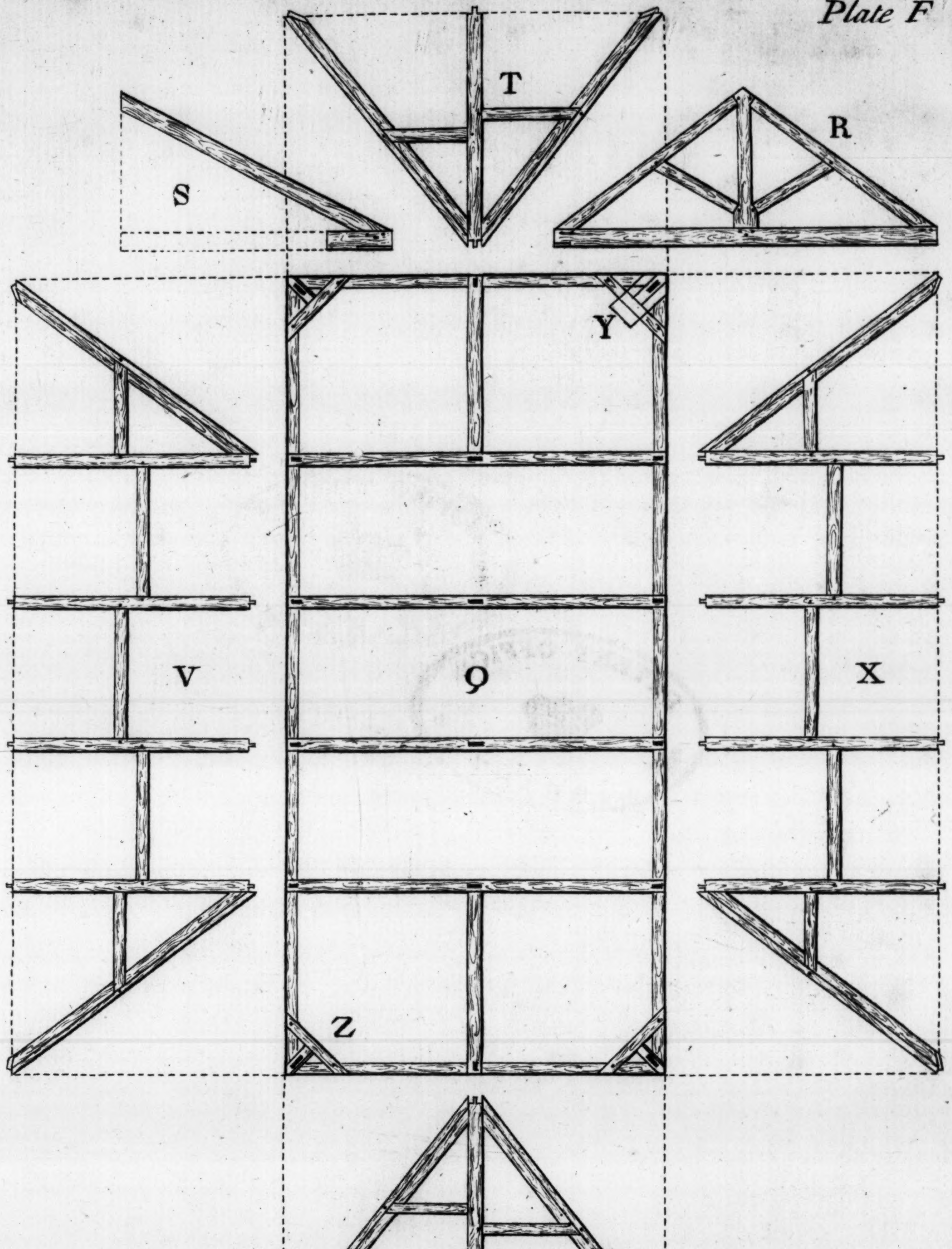
Every man who frames roofs, does firſt piece his plates, cock or dovetail down his beams on the ſaid plates, and prepare pieces on which his hips are to ſtand; as appears in this plan Q, as at Y, Z.

Then he frames his principals, as R; and likewiſe his hips, as S, into the pieces prepared for them to ſtand on: And although all theſe reſpectively are framed, for the generality, on the floor, and which in practice is the beſt way, they are here placed by themſelves, to avoid confuſion.

I hope the prick'd lines are enough to ſhew that the skirts, T, V, W, X, are laid out agreeable to the plan Q; and in which are ſhewn that one purlin lies above the ſtrut, and the other below it; for if all were to lie in a right line, in the firſt place, it cuts the ſtuff to pieces, ſo as to weaken it ſtill more, and at the ſame time, you looſe your pinning.

Here is ſhewn a method to turn up your hip moſt exactly true without backing at all; and is thus: Your hips being firſt framed into the pieces they are to ſtand on, take a broad board, or ſmall pannel; lay it on the place where your reſpective hip ſtands, and there mortiſe it as if it was your beam; cut off the corners of it; ſo as to make its angles agreeable to your plan, whether ſquare or bevel; laſtly, when you come to turn up your hip in framing the skirts, ſlip this mould, as Y, upon the tenon at the foot of your hip, and there give it a tack with a nail; the angles of that board will turn up a hip, as deſired, and is far preferable to any other method whatever.

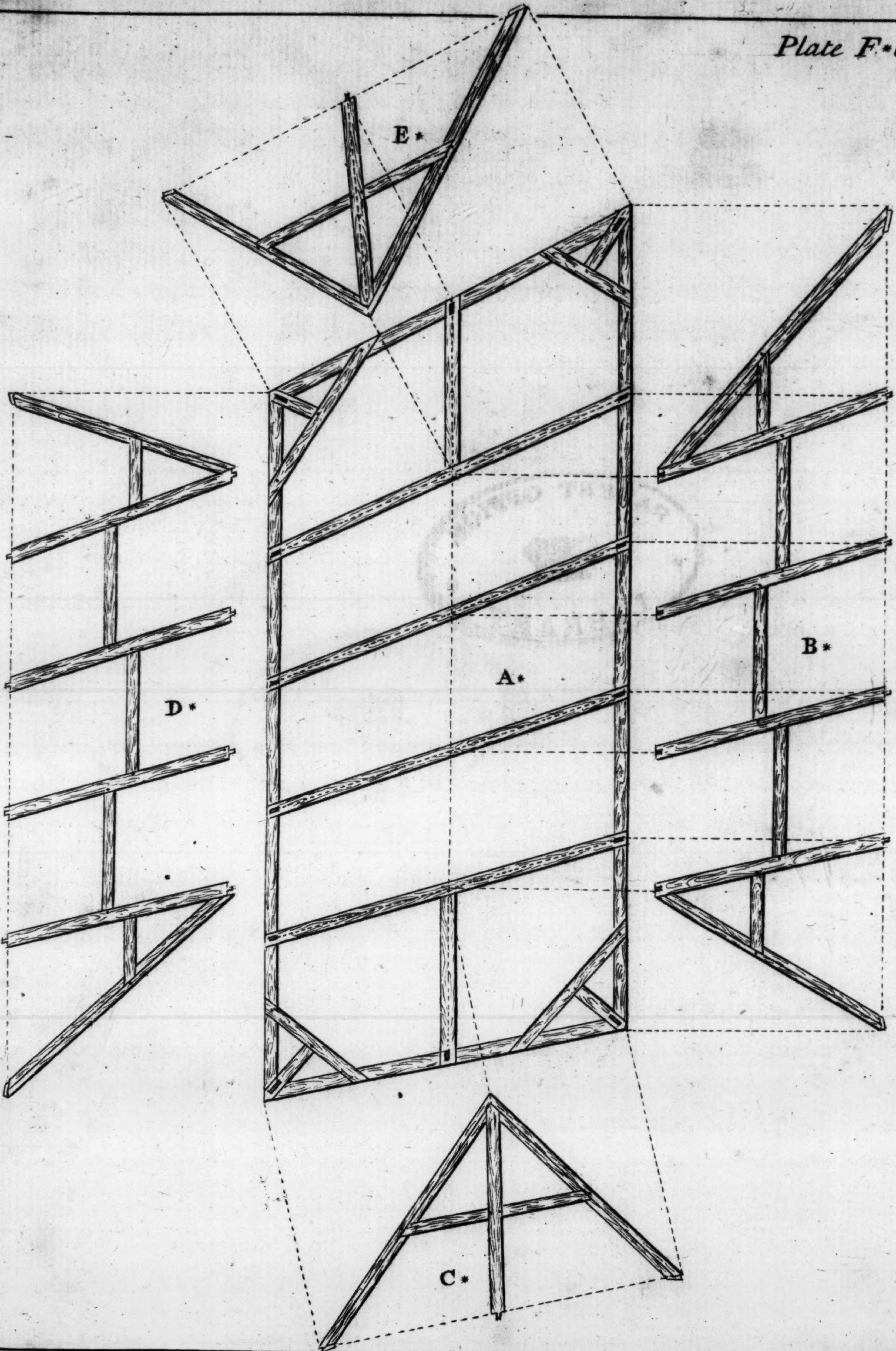
Plate F



F. Price inv. et delin.

Toms sculp.

Plate F*G.



F. Price inv. et delin.

Toms ſculp.

FOR general uſe, I did make myſelf intelligible in PLATE E: My meaning there being to ſhew how to avoid abundance of trouble if poſſible: But becauſe ſometimes buildings muſt be bevel, and neceſſity requires the beams to be laid ſo, to miſs ſome chimney or window; therefore let A*, repreſent a bevel plan, and whoſe beams alſo lie bevel; I doubt not but the pricked lines will ſhew how much each principal rafter muſt lie bevel, at the time of framing; and that is, juſt as much as half the beam does, that the rafter ſtands on; the ſkirts B*, C*, D*, E*, are the ſame way ſhewn, as before.

The method deſcribed in PLATE F, with being ſeparately applied, will turn up each hip, and alſo each principal rafter.

I hope it will not be taken ill, my ſaying that a man muſt be deprived of ſenſe, who would run into this almoſt endleſs trouble, of cutting his timbers all bevel, unleſs ſome unavoidable neceſſity require it, ſuch as above is obſerved, but rather uſe the method, I propoſed in PLATE E.

The ſides with each principal rafter, *&c.* and the pricked line at the foot thereof, is the bevel of each ſkirt reſpectively, as by the ſkirts lying in ledgement may appear, if compared to the bevel of the plan.

In this, and all other ſuch difficulties that muſt be well underſtood before executed, I adviſe that a model be cut out of a piece of wood, by a large ſcale; or with ſlit deal, form the ſkirts, as has been ſhewn, and by putting them together, ſo as to form the roof propoſed, all difficulties of this nature may be ſolv'd: And which indeed is the plaineſt way of demonſtration. I ſhall inſert one Plate more, concerning the form and manner of roofs, and then proceed to their proper declivities and ſections.

FOR general rules, whereby to form and frame a roof, there ſeems ſufficient variety already in the foregoing Plates; but as the general plan of a building muſt be managed after another manner, than has been mentioned, this Plate may not be deem'd unneceſſary.

Admit the plan F*, were to be prepared for a roof, either with hips, and vallies; or hips only: The ſaid plan is the ſame as in PLATE C*, D*; thoſe openings of G, and H, are over the ſtaircaſes; (in caſe they cannot be lighted from the ſides,) they may be left to be finiſh'd at diſcretion.

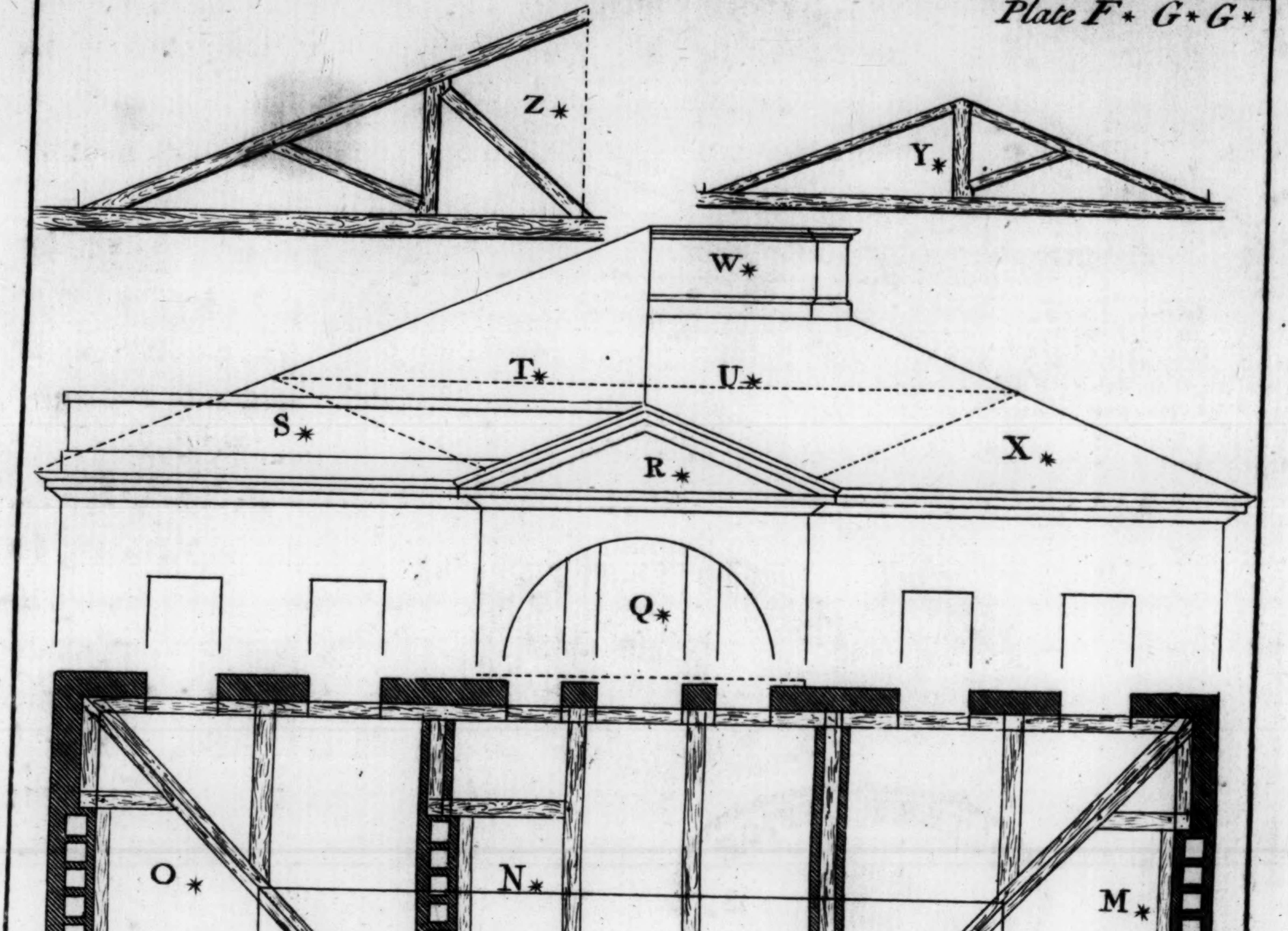
Let the firſt obſervation be the chimney funnels, as I, K, L, M, N, O; then deſcribe the windows, and doors; obſerving to place your timbers ſo, that they lie on the piers; (and not too near the ſaid funnels,) and at the ſame time, obſerve to connect them ſo together, as that they embrace every part of the ſaid plan; and not be liable to be ſeparated by the force and weight of the roof. I have repreſented the ſaid timbers ſo, that the foregoing paragraphs will explain the particulars of them. That of P, is a partition of timber, to diſcharge the weight of the roof over the ſalon.

Admit Q, the upper part of the front, and R, a pedement over the ſmall break, whoſe height gives that of the blank pedeſtal, or parapet S*; and ſuppoſe T, repreſented half the roof, as coming to a point or ridge, ſo as to ſpan the whole at once; which was the good old way, as we are ſhewn by *Serlio*, *Palladio*, &c. or admit V, to repreſent the roof, ſo as to have a flat, or sky-light over the lobby F*, its balluſtrade being W; or we may ſuppoſe X, to repreſent the roof, as ſpanning the whole at three times, and which may pleaſe ſome, better than either of the others.

Admit either of theſe were uſed; if that of X, then the vally and hip ſhould be framed as Y, the vally being ſupported; if as T, then the principal rafters ſhould be framed as Z, in order to bring part of the weight of the roof, and covering, on the partition walls; a farther explanation ſeems needleſs.

PLATE

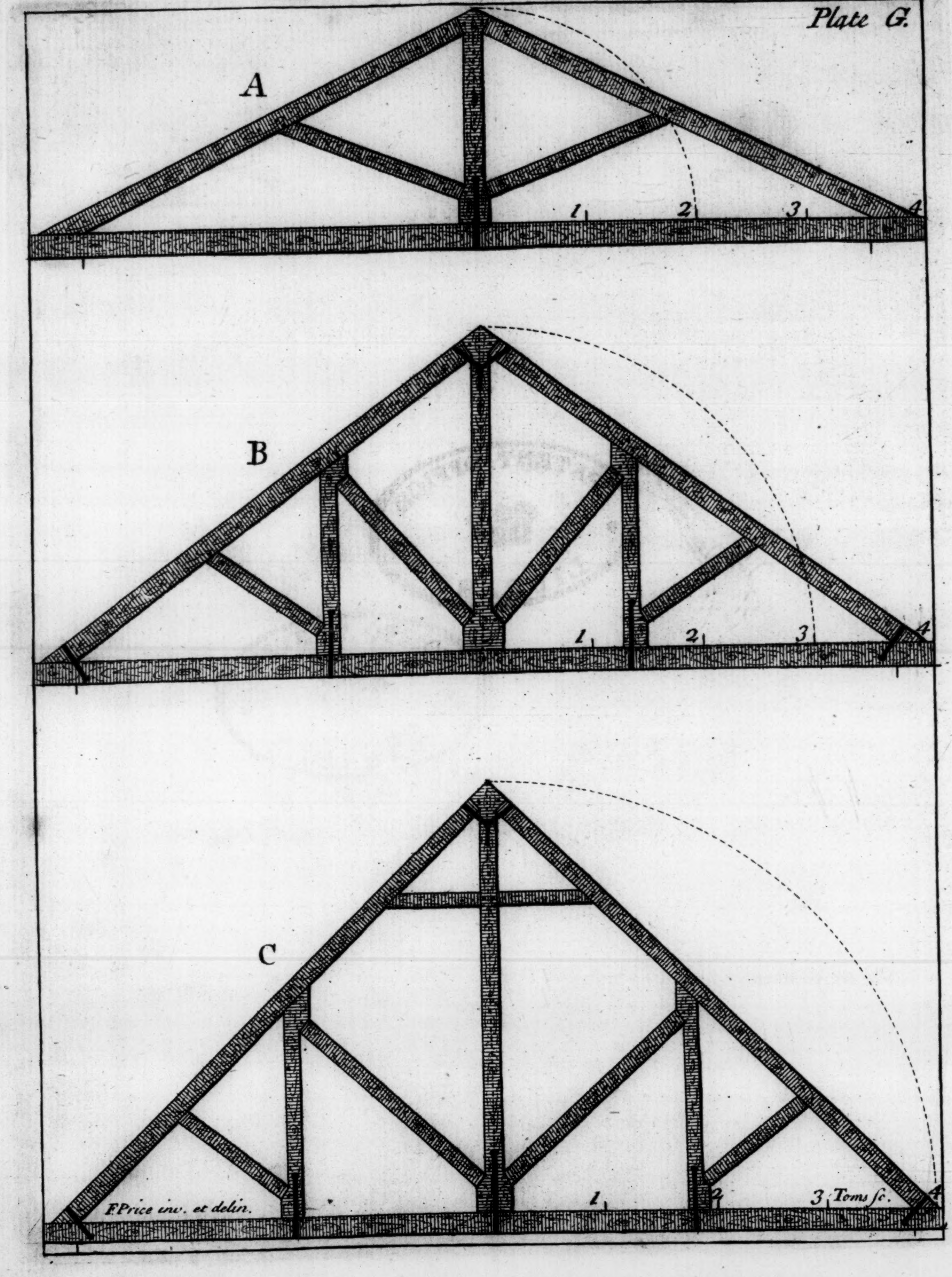
Plate F* G* G*



F Price inv. et delin

Toms ſculp.t

Plate G.



F Price inv. et delin.

Toms sc.

GRANTING that I have explain'd the manner of laying of roofs in ledgement, as far as may be ſhewn by mere inſpection, I propoſe therefore to ſhew the manner of making different pitches or ſlopes, agreeable to each kind of covering in uſe, as lead, pantiles, and plaintiles.

Take any width, as in A, and to be covered with lead; divide the width, firſt into two parts; and one of them, again, into four, as 1, 2, 3, 4; at 2, and with two of theſe parts, deſcribe the quarter-circle, which gives a proper pitch, or ſlope to be cover'd with lead: And is call'd pedement pitch.

Again, take any width, as in B, and to be covered with pantiles; divide it, as before, into two parts, and again one of them into four, as 1, 2, 3, 4; with three parts, as at 3, deſcribe the quarter-circle: Which gives a proper pitch for the uſe.

Alſo take any width, as in C, and to be covered with plaintiles; divide it into two parts; with one make the quarter-circle, as the prick'd line ſhews: Which gives a pitch, or ſlope proper for the uſe.

Theſe truſſes have been practiſed with ſucceſs; and therefore better to begin with.

The ſhort lines under each beam, repreſent the in-ſide of the wall, ſo that the weight of the truſs relies wholly thereon.

PLATE H.

HOW neceſſary theſe ſections of roofs may be thought, I cannot ſay; but they were introduced, leſt the methods made uſe of before, ſhould not give variety enough.

And although it ſhould be argued, there is not a neceſſity for either, yet the truſſes in each may be acceptable: And I think, they need no apology.

Take any width, as D, which is to be covered with pantiles; divide it into ſix parts, as appears by the draught; take four of theſe parts, and with them make two ſections, as the prick'd lines ſhew; the inteſection of theſe lines gives the height, or pitch of the roof.

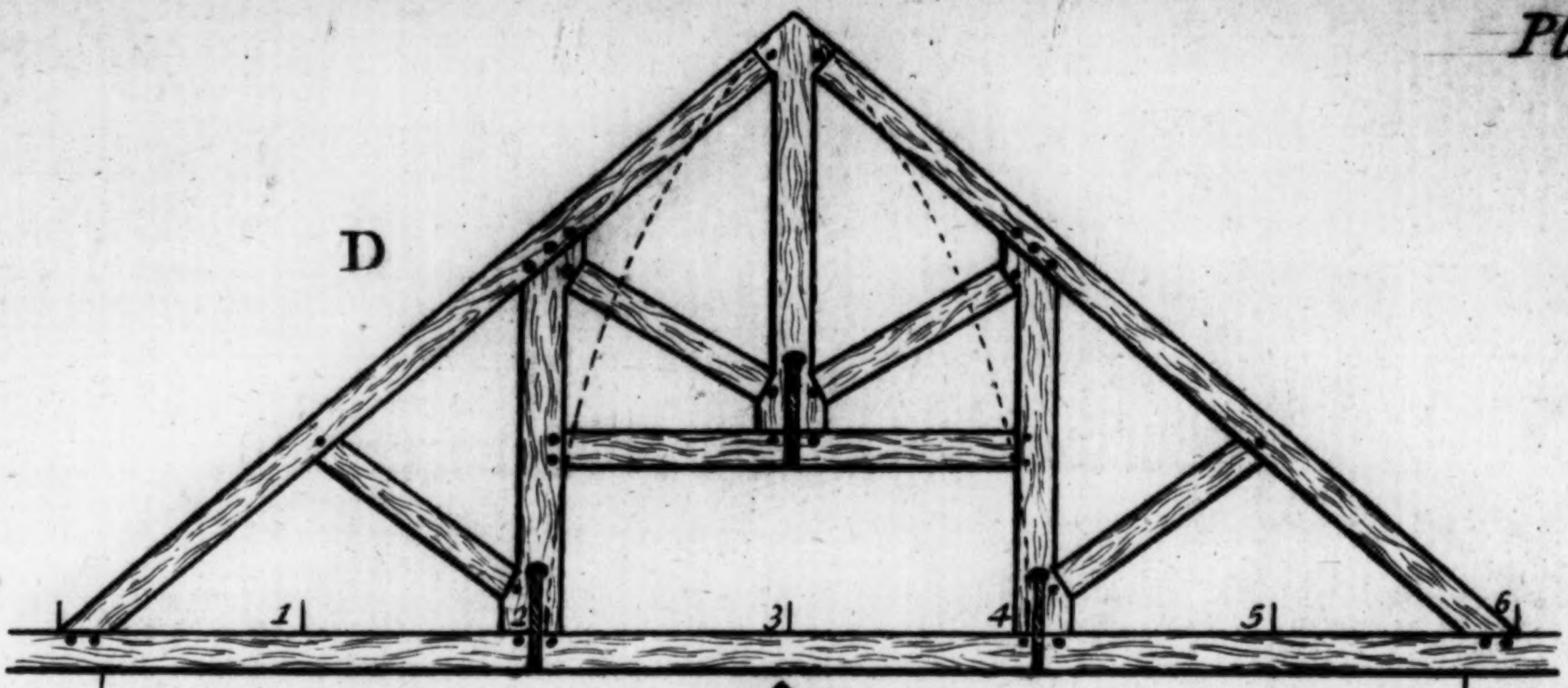
Take alſo any width, as E, which is to be covered with ſlates; divide it into ſeven parts; take five of them, make the two ſections; their meeting forms a complete pitch, or ſlope for ſlates, as appears by the draught.

Take any width, as in F, and to be covered with plaintiles; divide it into eight equal parts; with ſix of thoſe parts, make the two ſections; their meeting forms a ſlope proper for plaintiles, called true pitch. And whereas the moſt eminent writers, both antient and modern, have taken notice of the ſections of the roofs of thoſe buildings they repreſented, therefore I choſe to give a great variety of truſſes, not only to gratify every one's humour, but becauſe it demonſtrates the laws of ſtrength and weakneſs, and therefore neceſſary to be known by every one, and which chiefly prompted me to compile this treatiſe.

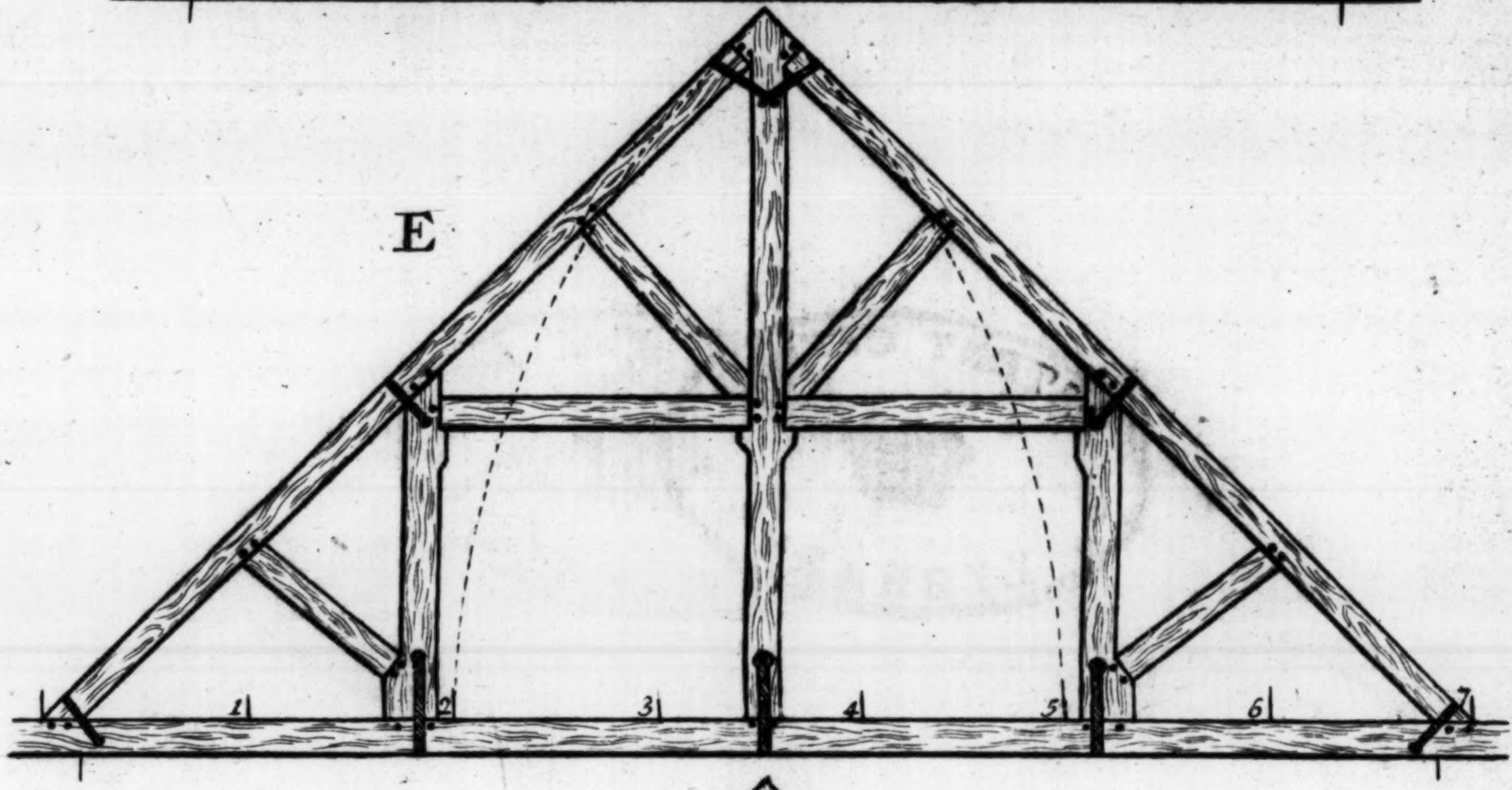
* * *

Plate H.

D



E



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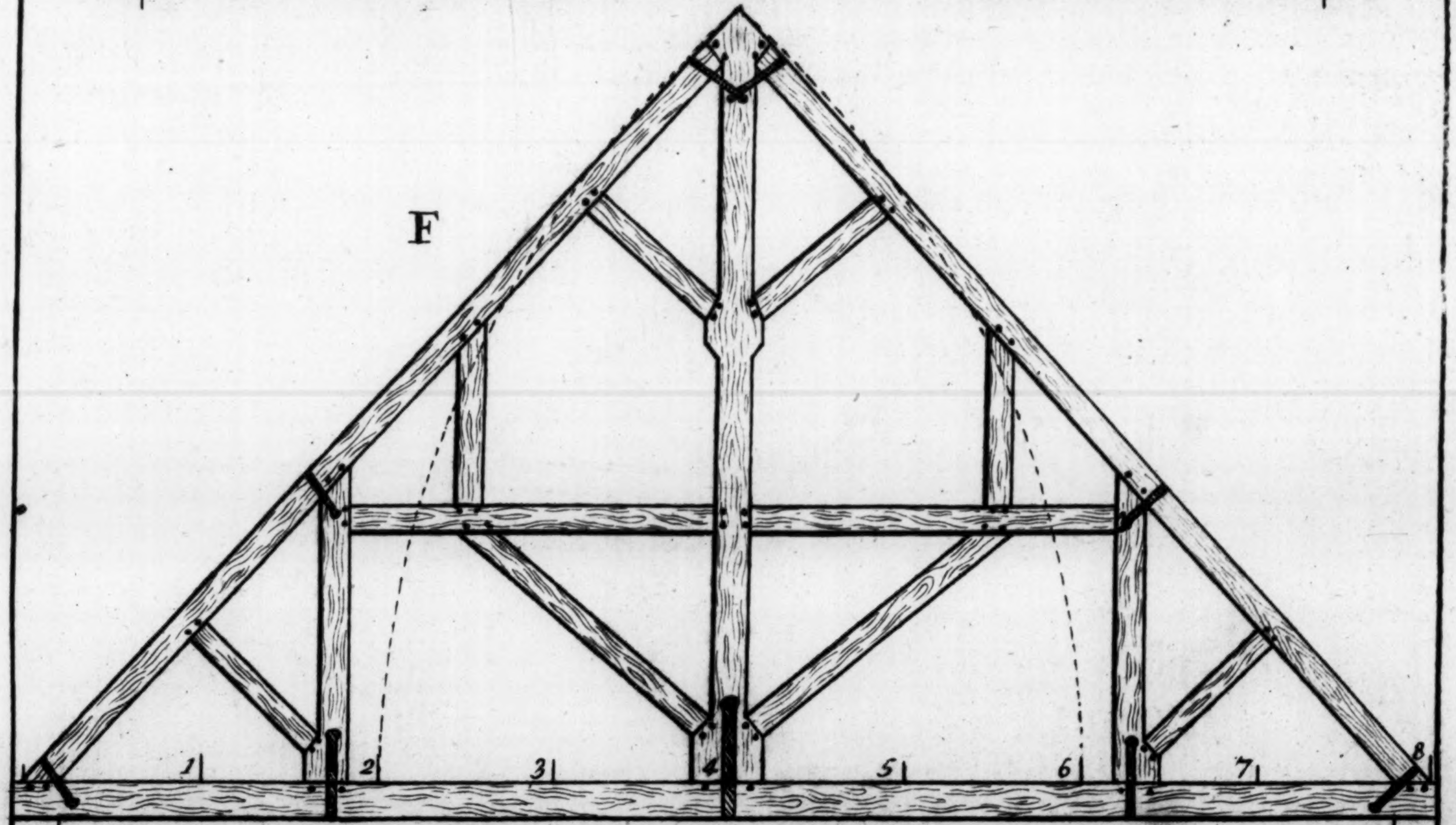
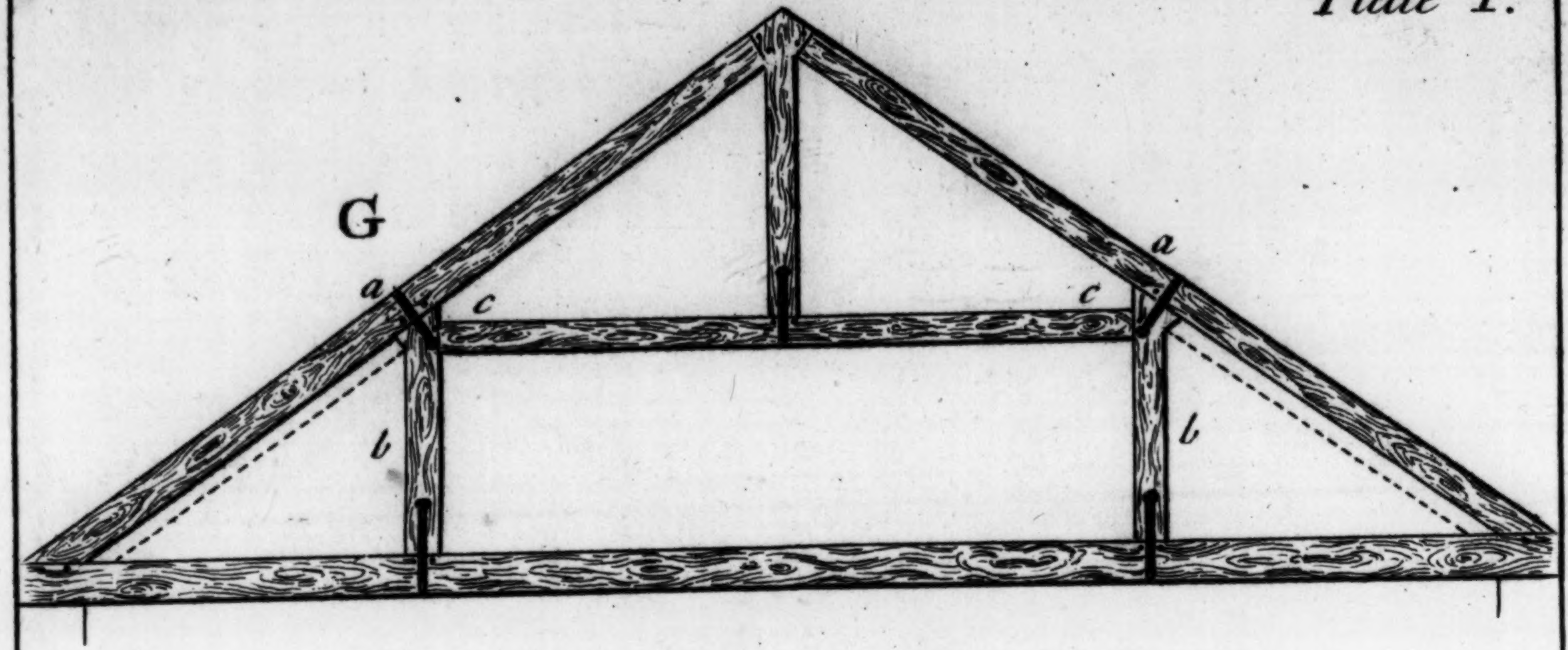


F. Price inv. et delin. Toms sculp.

Plate I.

G



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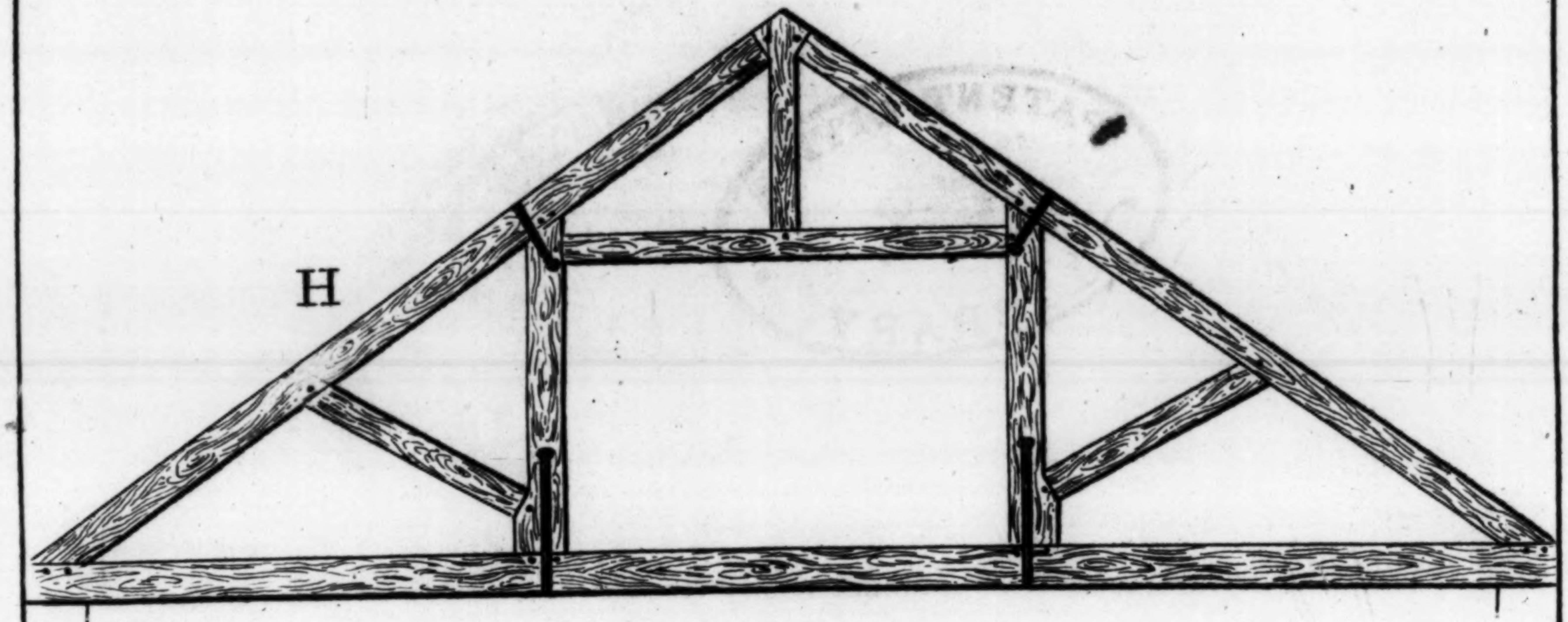
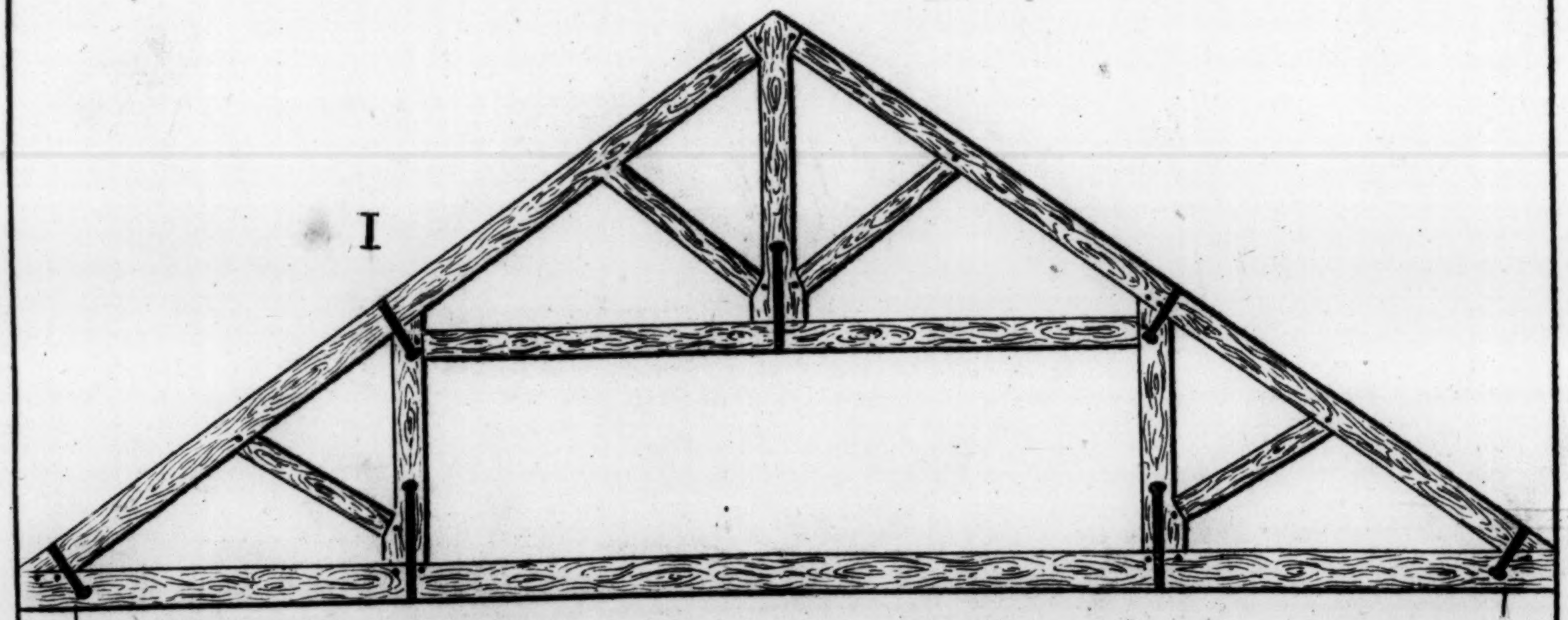


I



F. Price inv. et delin.

Toms sculp

PLATE I.

I BELIEVE theſe truſſes may be acceptable, although they differ ſo very little from thoſe in the laſt, PLATE H. The ſtrength of this or any other truſs may thus appear.

In G, the prick'd poſts b, b, (or king-poſts b, b,) being tyed to the back of the rafter, as at a, a, with iron ſtraps, as appears in the draught, ſo firm that it cannot yield; if the ſtrutting-beam c, c, be drove in very tight, it takes all the weight off from the rafters, as at a, a; and if ſome extraordinary weight be to hang thereon, as the machinery of a theater, then it would be well to cut the ſaid king-poſts with a joggle, by which means you might put braces, as repreſented by prick'd lines under each rafter, ſo as to make this truſs able to carry any burthen whatever, at the extent of ſixty feet, *&c.* allowing the truſs G, to be ſufficiently ſtrong: I ſay, this of H may be well adapted to many uſes; as dividing the floor, and rafter, each into three equal bearings. If occaſion require it, you may cut the king-poſts with a joggle, and make uſe of braces underneath the rafters, as before.

Alſo this of I, by what was before ſaid, may be rendered a complete good truſs for almoſt any uſe, there being ſo large an opening, as indeed is requiſite in what was before obſerved, altho' this allows of good garrets, if uſed in a dwelling-houſe.

What is ſhewn, and mentioned, in theſe three PLATES, of roofs whoſe ties remain entire, may be ſufficient.

All that I conceive neceſſary to be ſaid further, is, that the leſs in number the diviſions or pieces are, which compoſe each truſs, the ſtronger it is; for even the ſhrinking of the wood will let a well-framed truſs ſag, or droop, in proceſs of time; for which reaſon I cannot help recommending *Engliſh* oak, particularly for king-poſts.

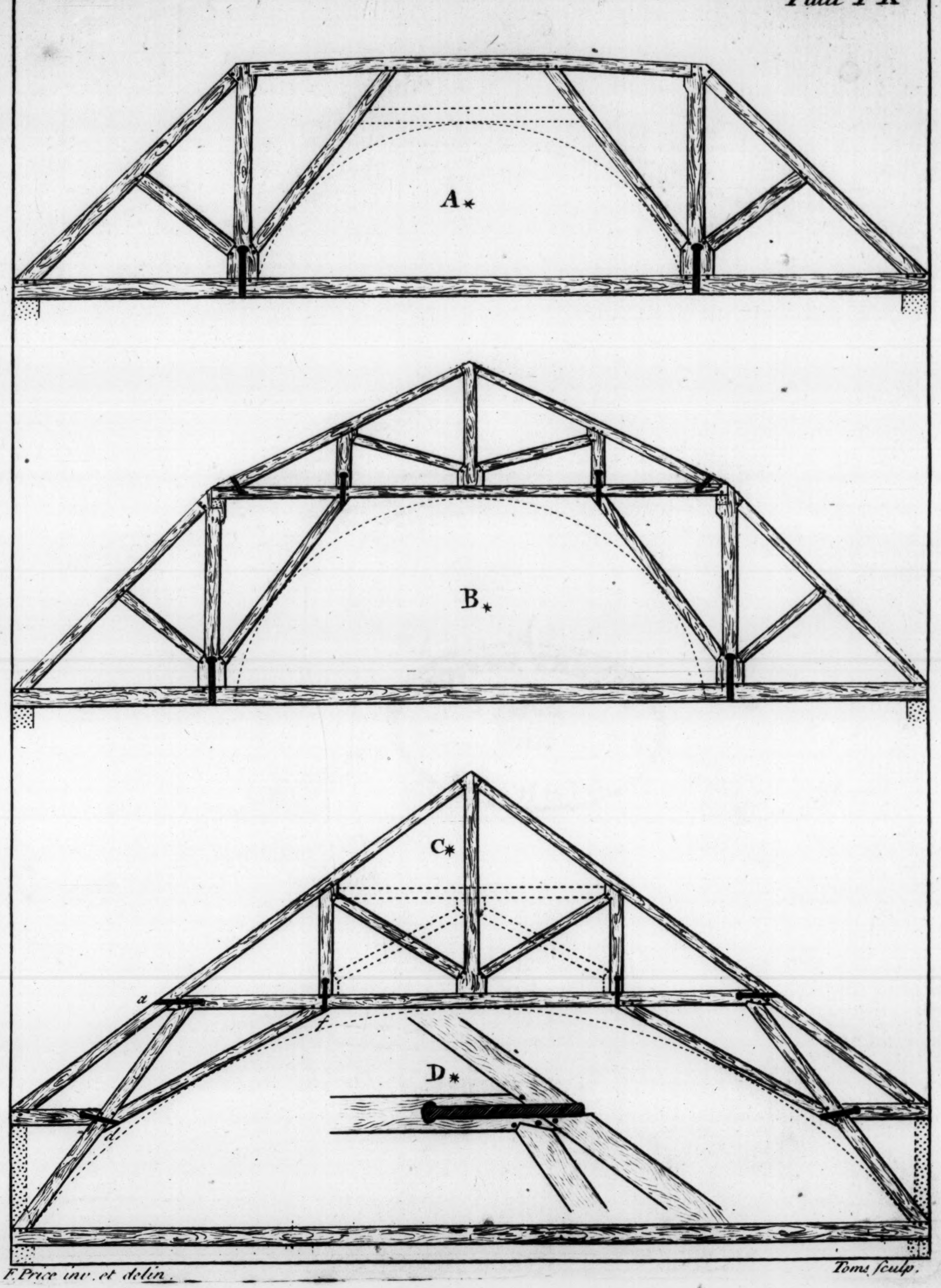
PLATE I*, K*.

I Know there are ſeveral ſections of roofs already given by others; but as no other book yet publiſhed gives any tolerable account of them, I make no doubt of theſe giving ſatisfaction to the curious.

Theſe three truſſes may be uſeful where lodging rooms are wanted in the roofs, if uſed in dwelling-houſes. And as their ties may be interrupted, or not, as occaſion ſhall require, they are therefore applicable to other uſes, and ſeem to want no explanation otherways than this; that of A, is well adapted to ſuch a ſituation as would command a fine proſpect, from the flat on top of it; or might pleaſe ſuch as don't love to ſee a high roof; that of B, is called a kirb roof, and is much in uſe, on account of its giving ſo much room withinſide; that of C, is an exceeding good truſs for a roof, if applied on a dwelling-houſe where garrets are wanting; or is fit to place on a large *Salon*, *Chapel*, &c. It may with much ſafety be converted into a good truſs for a bridge, or a roof with a flat on top of it, if the prick'd lines be obſerved duly.

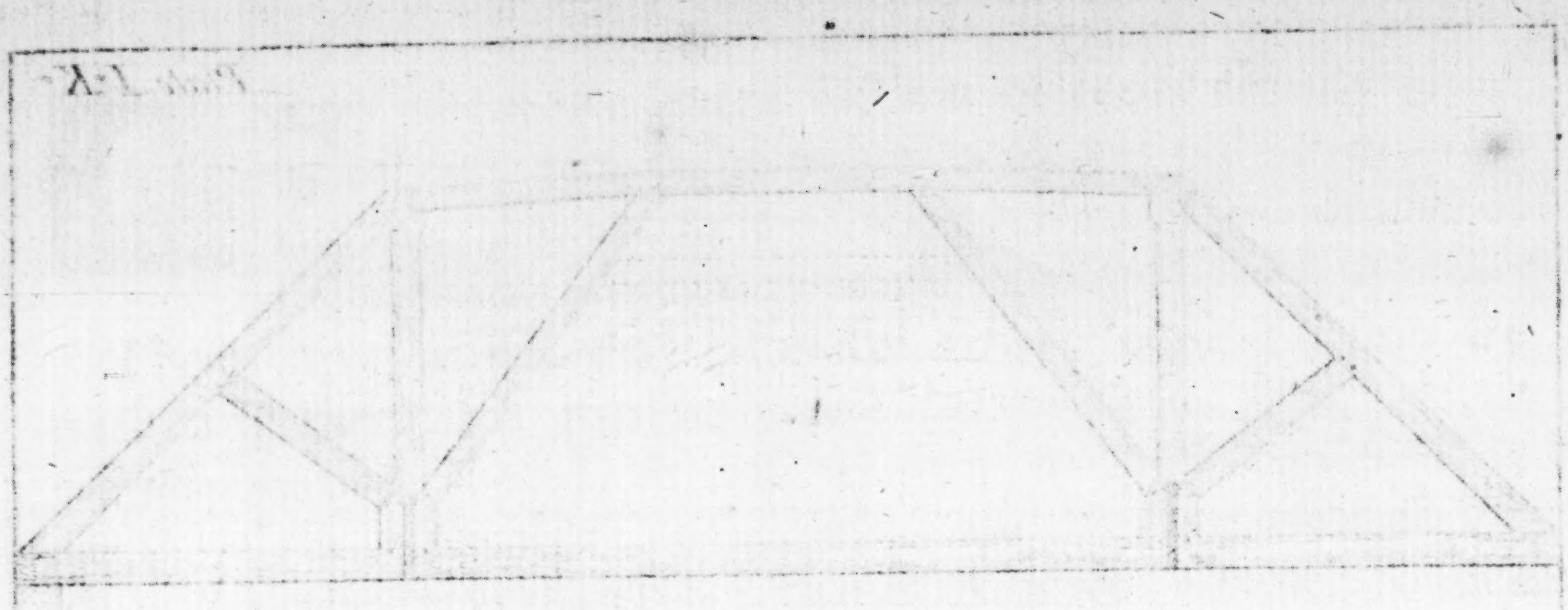
N. B. There is one particular, that had like to have eſcaped my notice, concerning the placing of iron ſtraps on any truſs, thereby meaning to help its ſtrength, which is by turning the end ſquare, as thoſe of d, f, and a; which may appear more apparently in D; this method embraces the timber in ſuch a manner, to make it like a dovetail, *which cannot draw from its place*; another obſervation is, to bolt on your ſtraps with ſquare bolts; for this reaſon, if you uſe a round bolt, it muſt follow the auger, and cannot be helped; by this helping the auger hole, that is, taking off the corners of the wood, you may draw a ſtrap exceeding cloſe, and at the ſame time it embraces the grain of the wood, in a much firmer manner than a round pin can poſſibly do.

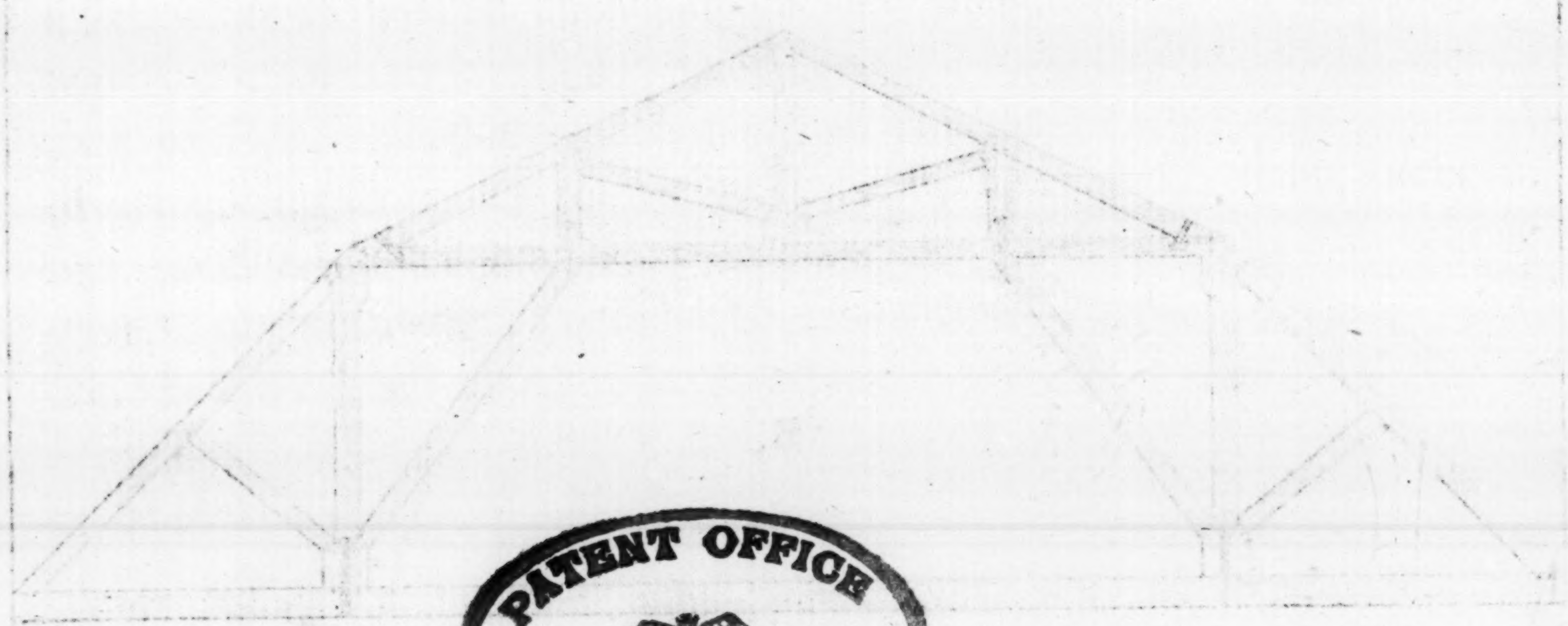
Plate I*K*



F. Price inv. et delin.

Toms sculp.





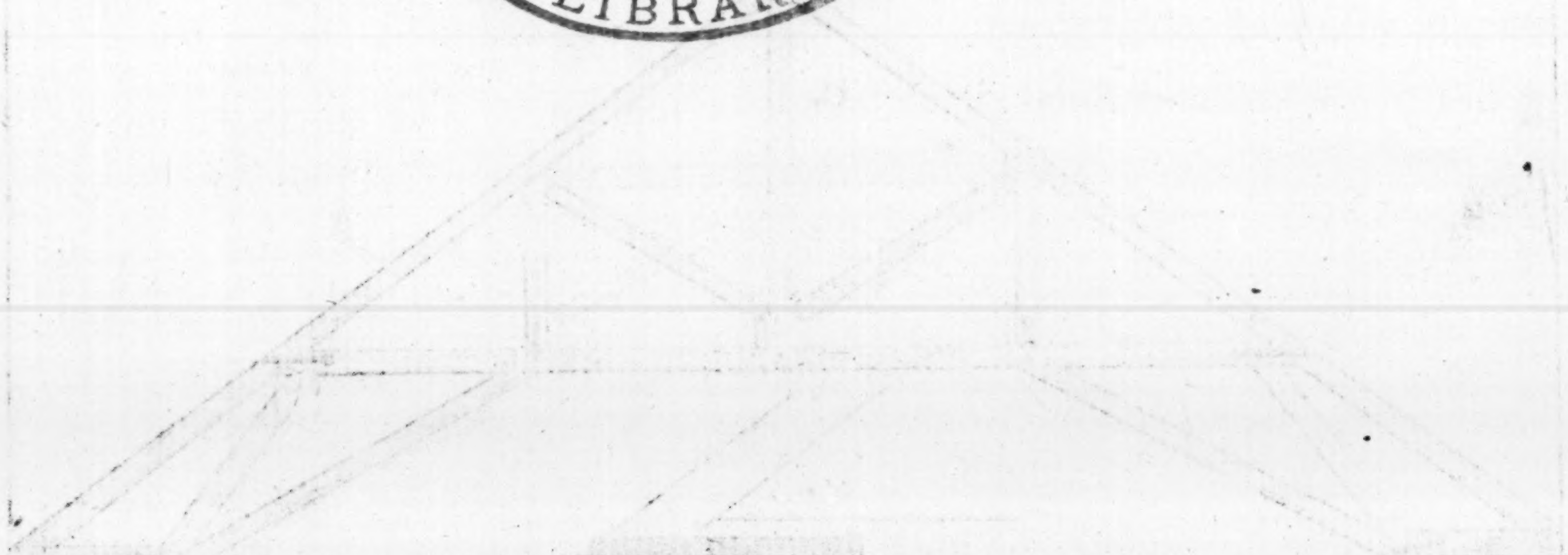
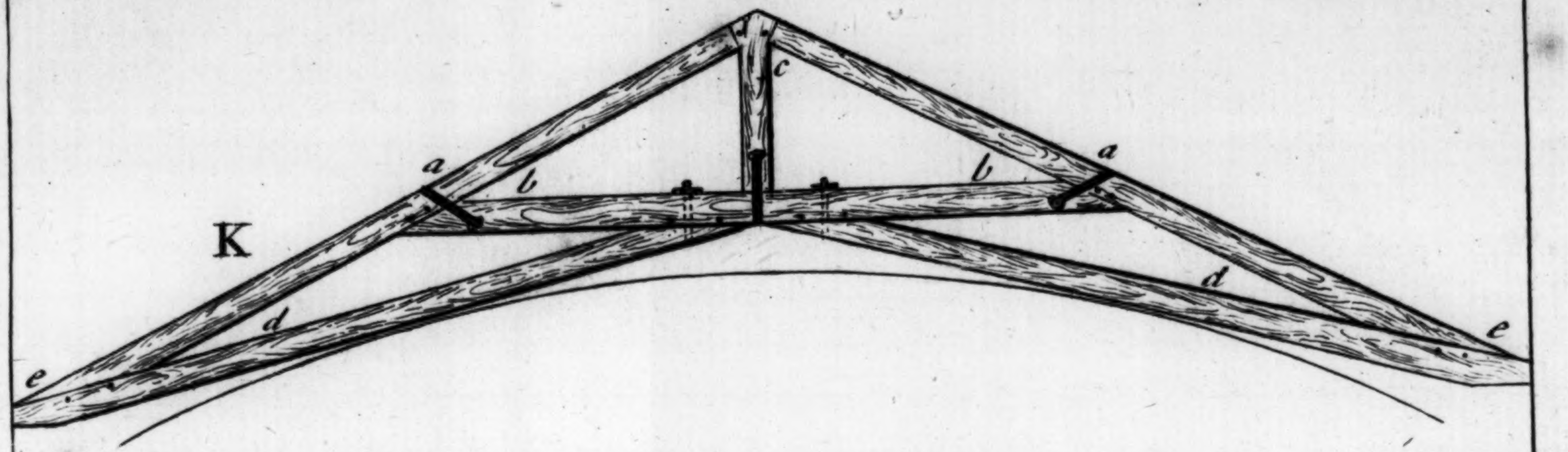
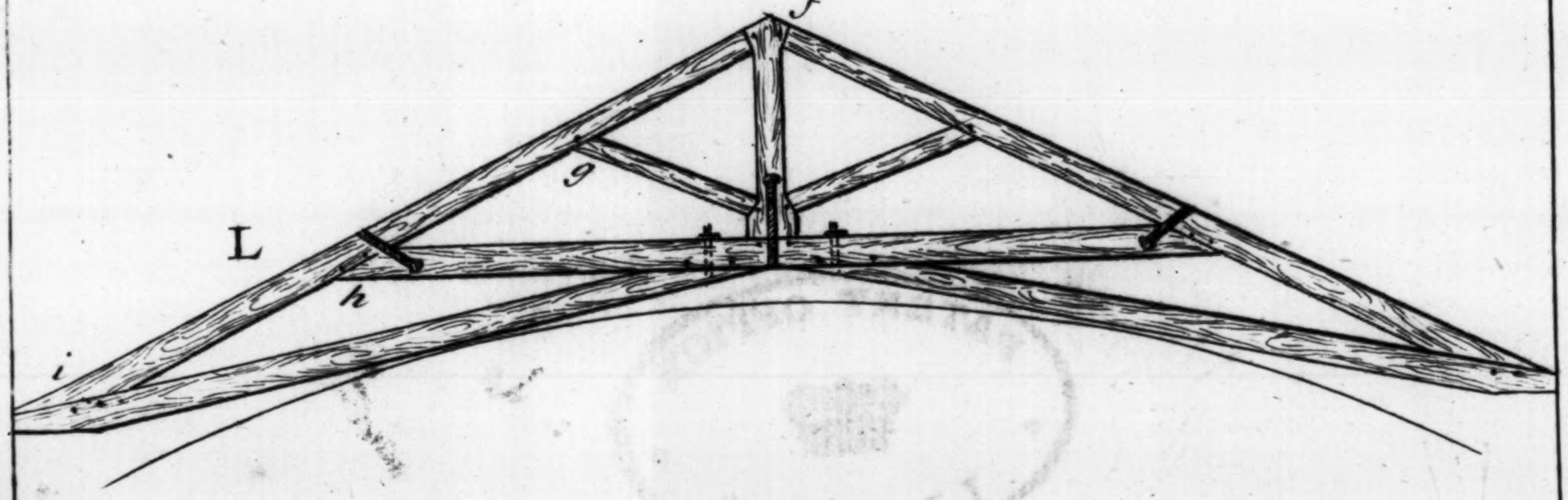


Plate K.

K



L



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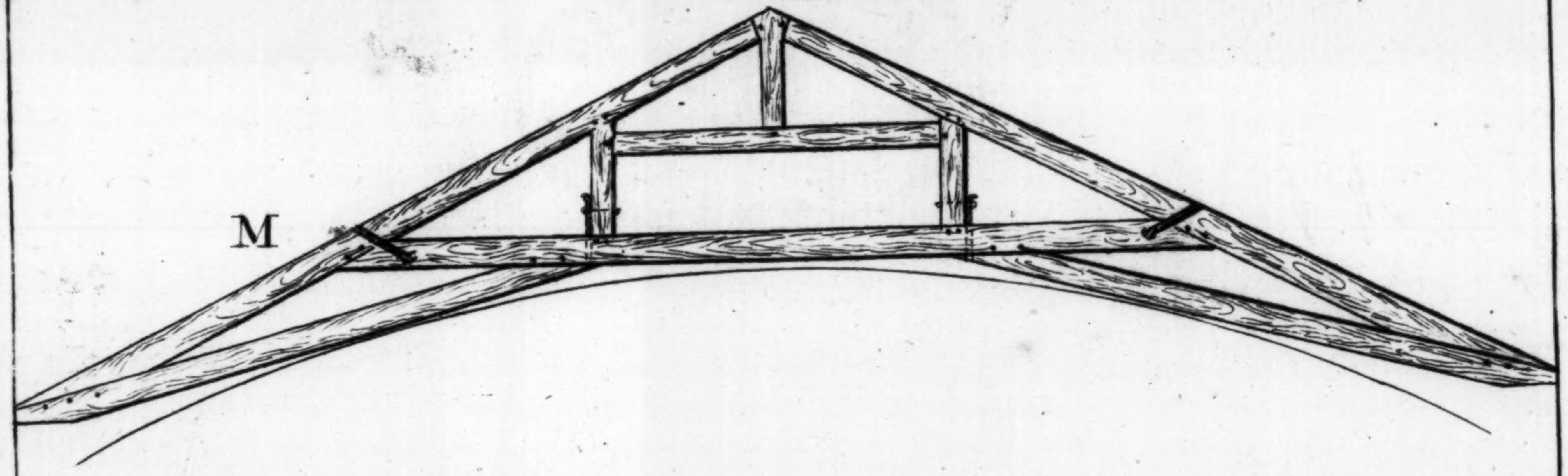
M



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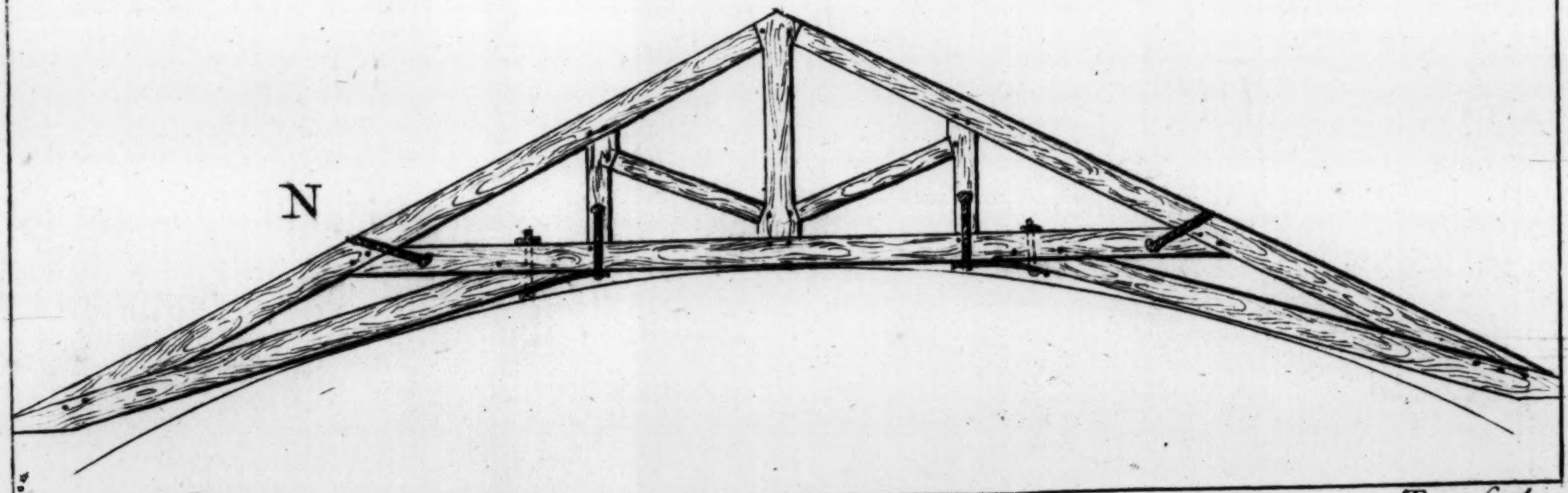

F. Price inv. et delin.

Toms ſculp.

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PLATE K.

KNOWING variety to be moſt entertaining, I have introduced four truſſes, whoſe tie or beam is interrupted, and may be ſuited to ſome places, where the others might not be ſo well adapted.

Here alſo, as in *Fig.* K, it is propoſed to demonſtrate the ſtrength of a truſs, leſt the mention before ſhould not be ſufficient to make it evident they are really ſtrong; and tho' this ſhould ſeem tautology to ſome of my readers, it will not, I am perſuaded, appear ſo to all.

Firſt, then, the beam b, b, being tyed to the back of each rafter, as at a, a, with an iron ſtrap, in a firm manner; alſo the king-poſt c, tyed to the beam b, b, I doubt not but the upper part will be allowed ſtrong, or firm; if ſo, let the hammer-beams d, d, be well bolted to the beam b, b, and the bottom e, e, be framed as other principal rafters generally are; I ſay, if it be objected that there is too much truſt repoſed on the iron-work, may it not be asked, if any common ſtrap, at the bottom of a king-poſt, was ever known to break by continual preſſure? Witneſs the ſtraps in a theater, to which is fix'd a prodigious weight.

If that be granted, another objection may ariſe, in putting them together, and which I ſhall endeavour to anſwer.

Let the truſs L, be required to be put together. Firſt, enter your king-poſt into the beam; put in your braces; then enter the top of your principal rafters into the king-poſt, as at f; ſo by bringing down its bottom, you enter the brace g, and beam h; then enter your hammer-beam as at i; pin all together, and put on your ſtraps, and your bolts through both beams in a good manner. Then let one think what force can part them.

What is ſaid of this, may be ſaid of M, and N: Not that I would propoſe that either of theſe ſhould be uſed, without mature advice.

PLATE L.

LEST it ſhould be thought a negle&#x63;t, I have here ſhewn in two examples, how to contract the height of roofs, which are call'd M roofs, and frequently made uſe of.

Let O, be a truſs for a roof. By the figures it appears that one third part of its height is taken off, and yet the truſs is made firm with very little ſtuff and labour. On the head of the middle king-poſt is let in a gutter-plate, which bears the Inſide-rafters, and is ſo adapted to uſe, that you may ſupport it at pleaſure, between one truſs and the other.

In P, is ſhewn another truſs for M roofs; and by inſpection may appear to be but three fourths of the height, it would be, if the rafters were continued. In this, the gutter-plate lies on the ſtrutting-beam, and over the head of the king-poſt; by having thoſe braces under the principal rafters, I cannot ſay you need the braces ſhewn by the prick'd lines.

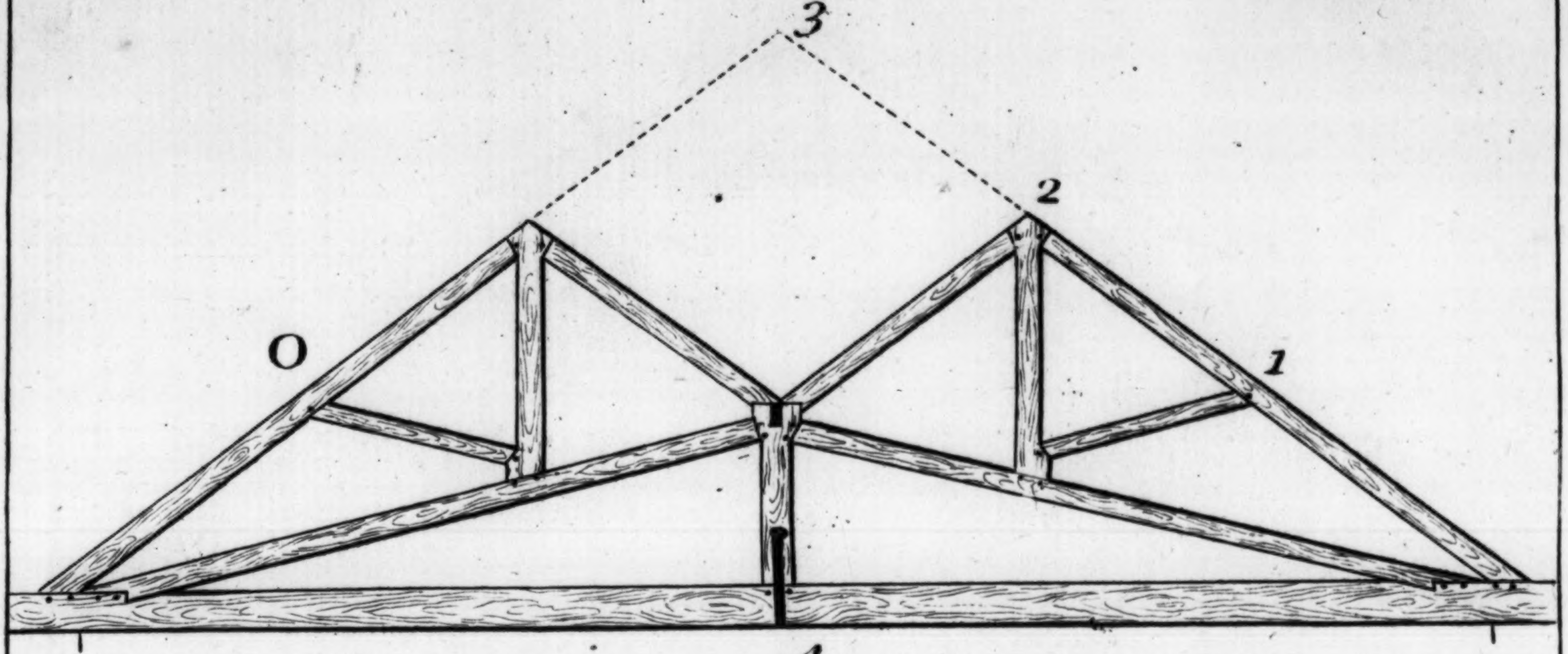
In Q, is ſhewn a roof whoſe ſpan is beyond the walls; ſuch as *Covent-Garden*, and *Horſley-Down* churches, and which gives a kind of ſhelter, therefore may not be miſapplied to other uſes.

At the foot of each rafter is ſuppoſed an iron ſtrap, that not only faſtens the rafter and beam together, but at the ſame time paſſes through a binding-beam, whoſe office is to bear the ſmall rafters between one truſs and the other; under which, and a-croſs the main beam of the truſs, ſuppoſe a flat bar of iron, ſo that the ends of the ſtraps have a ſcrew made on each; then conſequently two iron nuts being ſcrew'd on at the bottom make each truſs exceedingly firm. I imagine there is no difficulty in the execution.

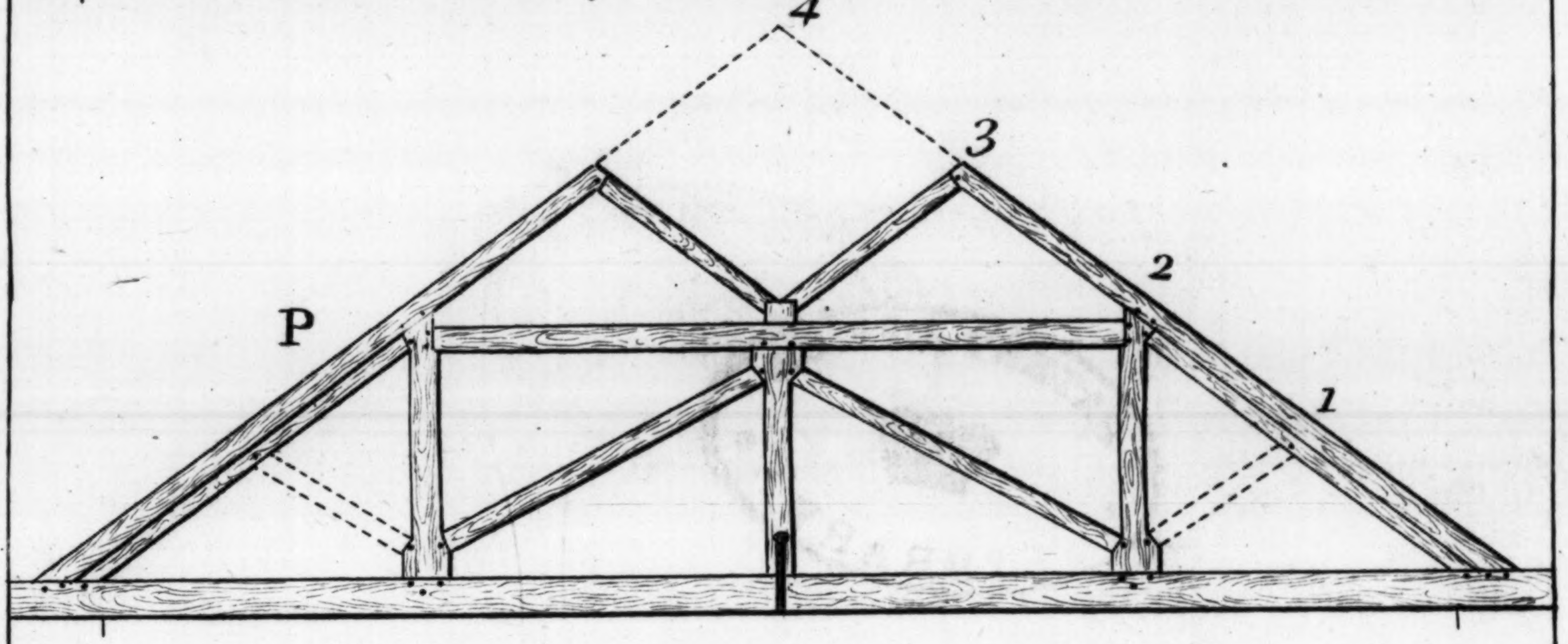
I do not mean to give offence, by deſcribing this truſs different to either of thoſe before mentioned, each doing its office excellently well.

Plate L.

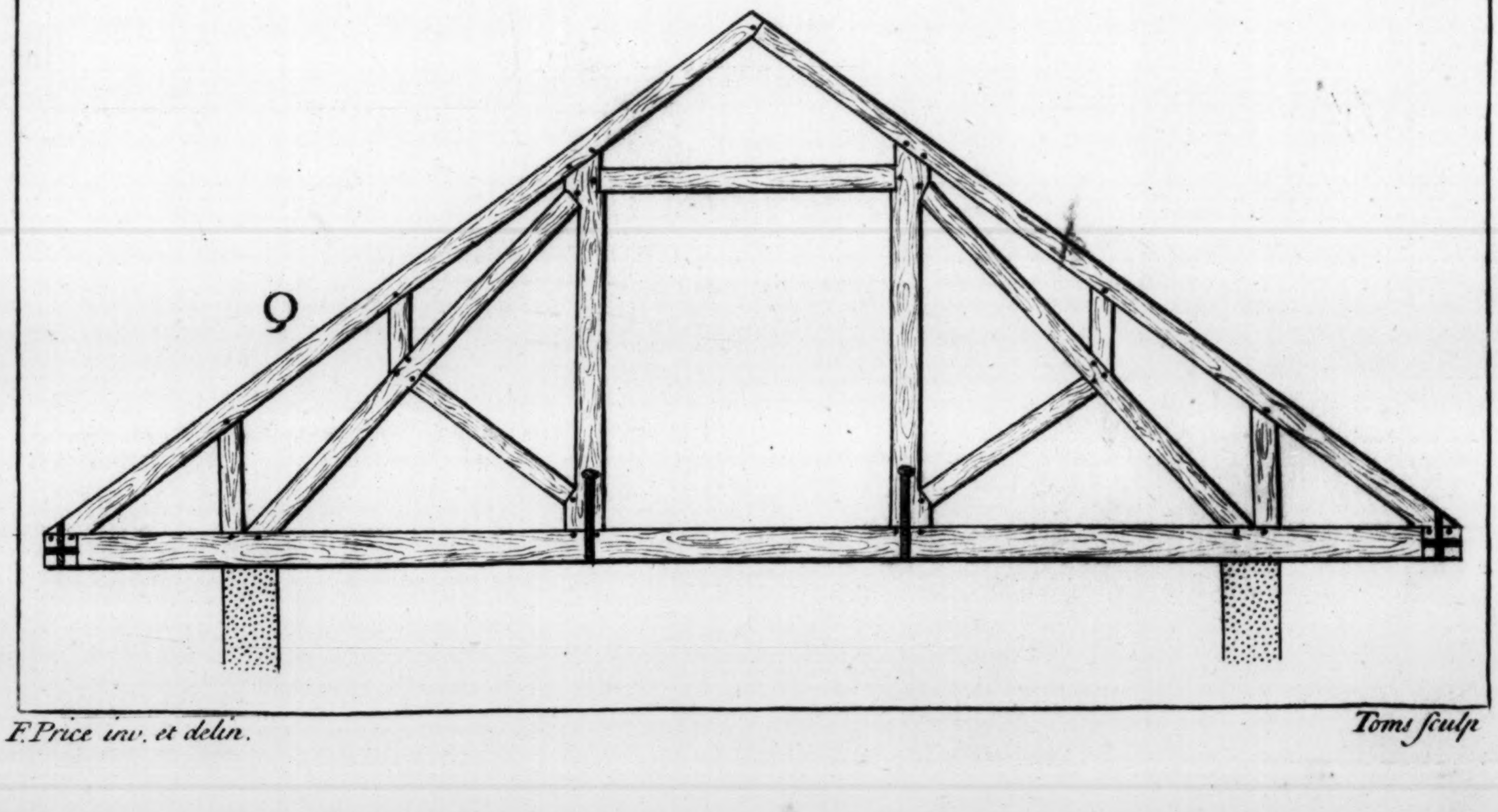
O



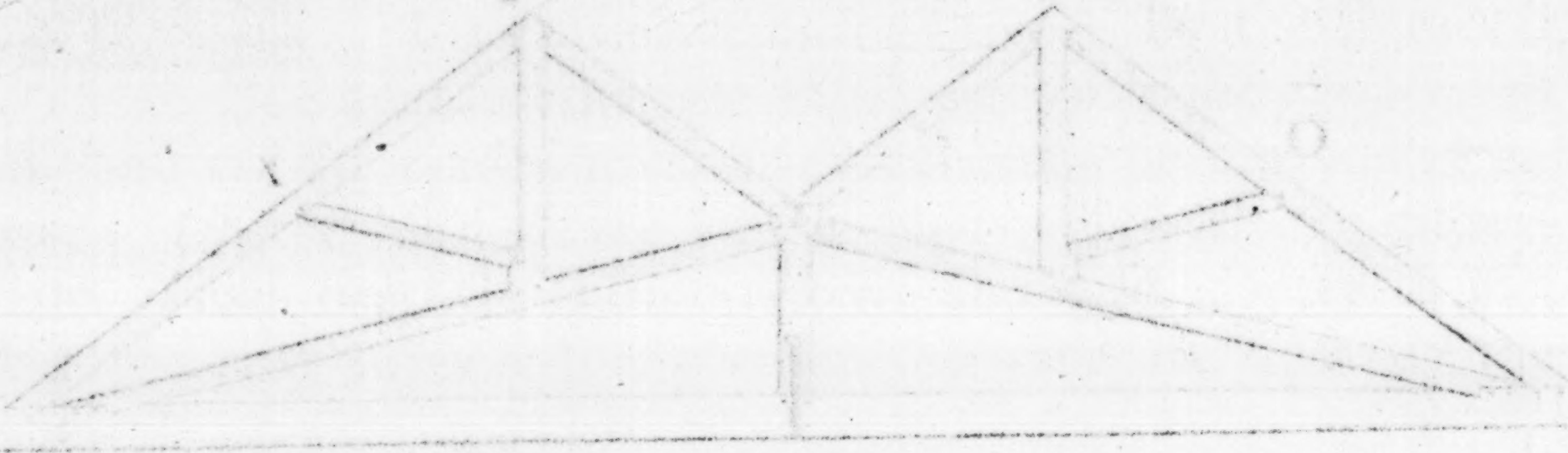
P

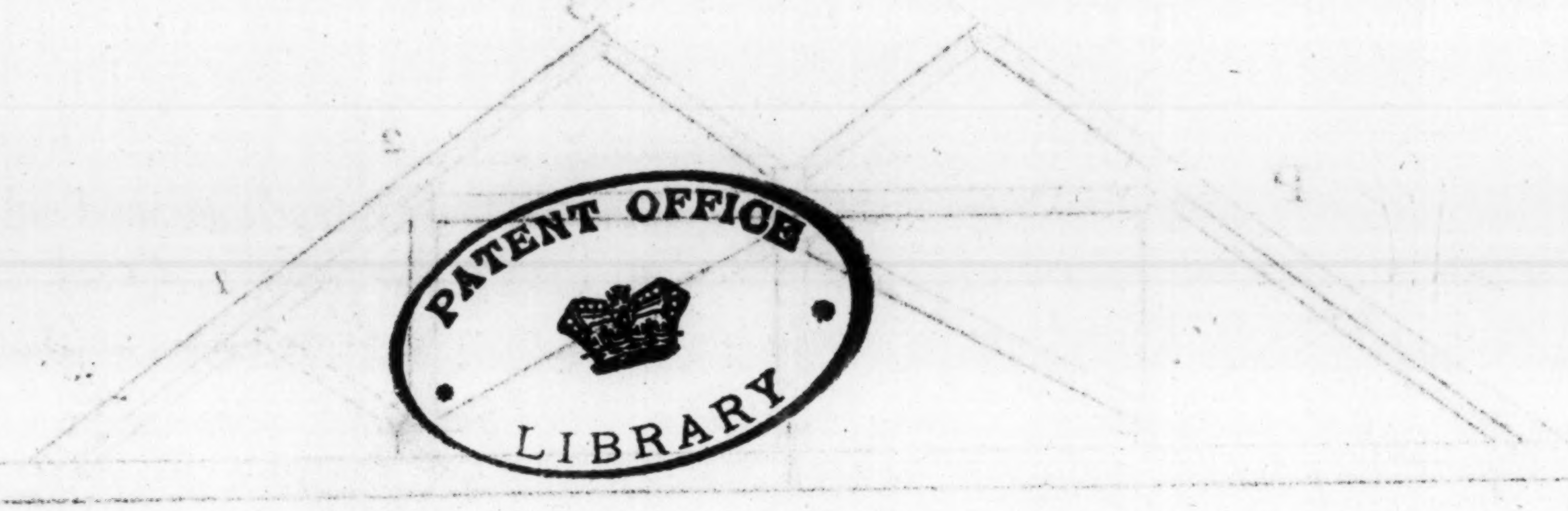


Q



F. Price inv. et delin. *Toms sculp*





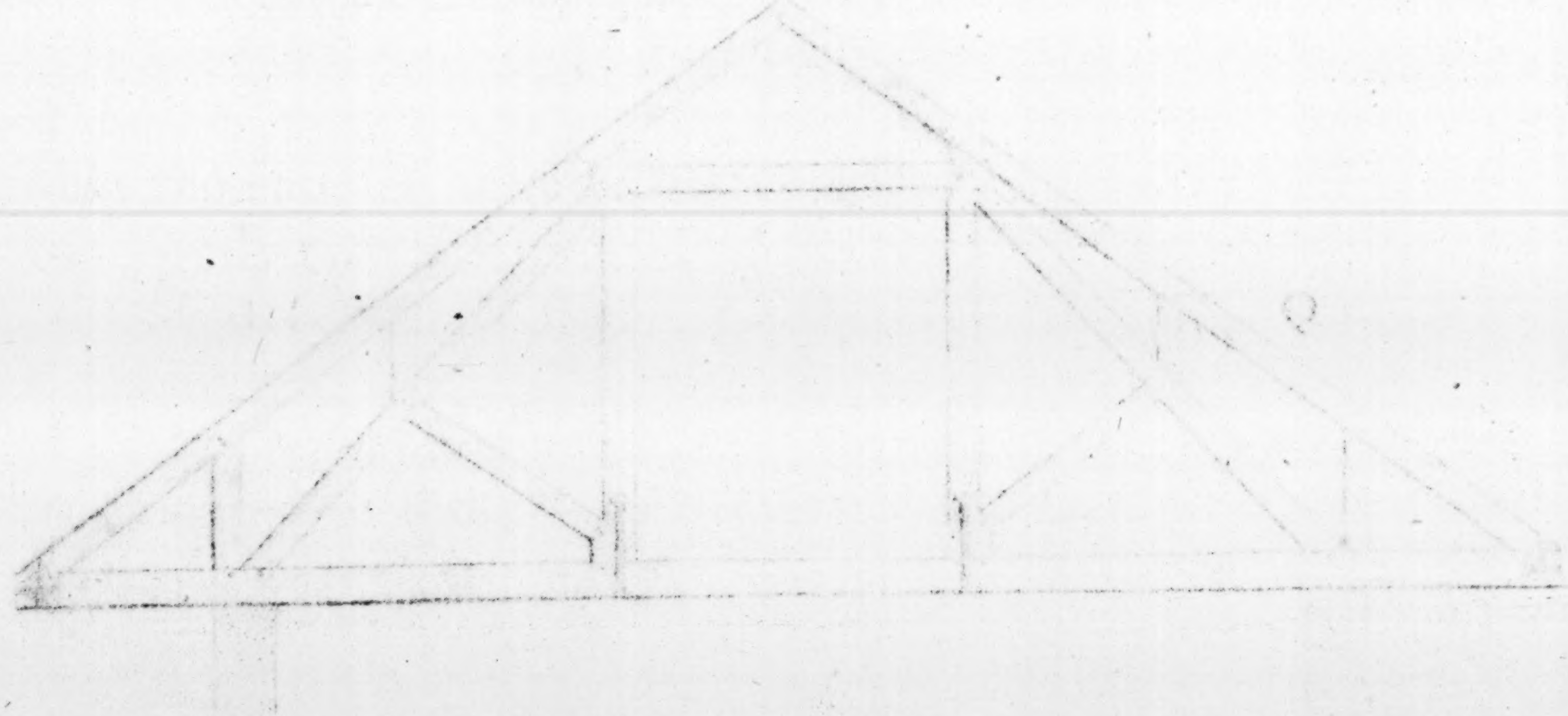
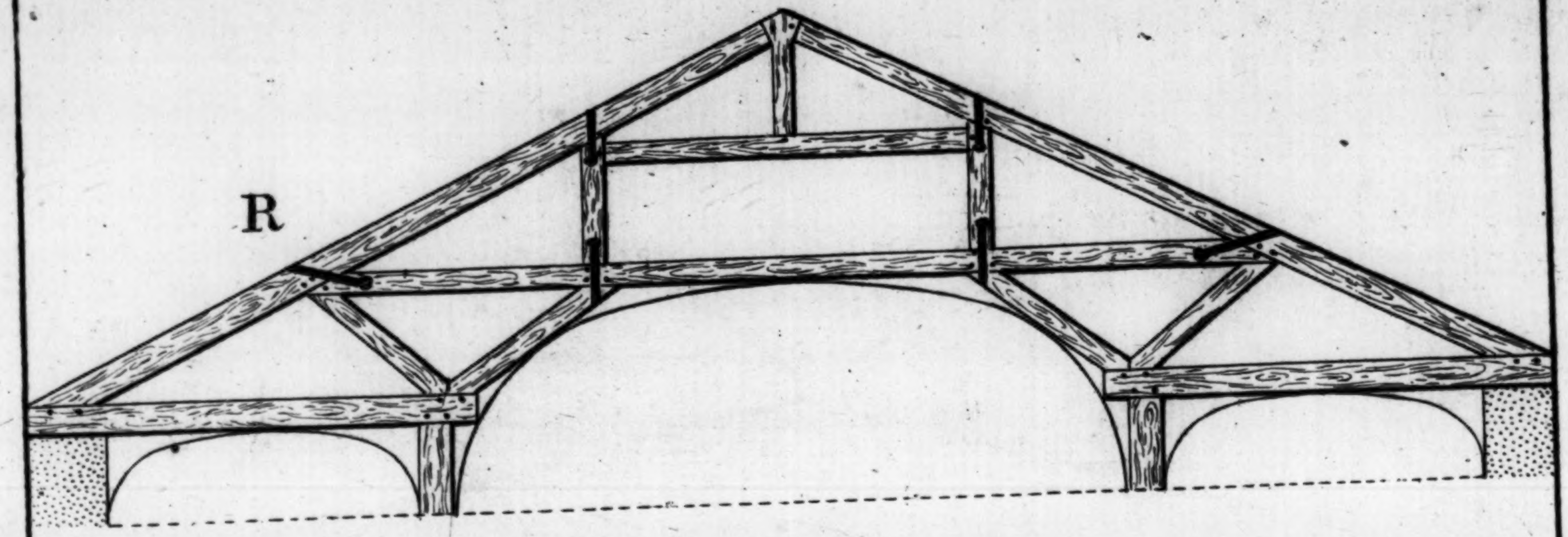
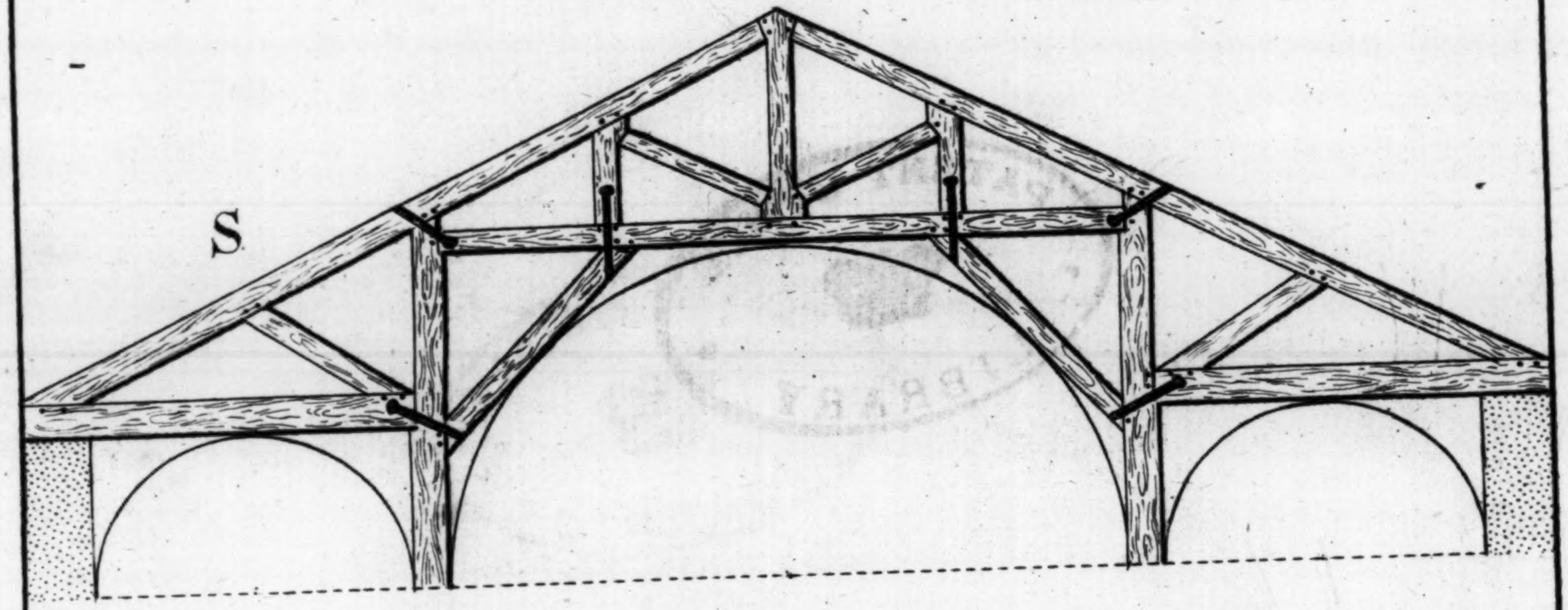


Plate M.

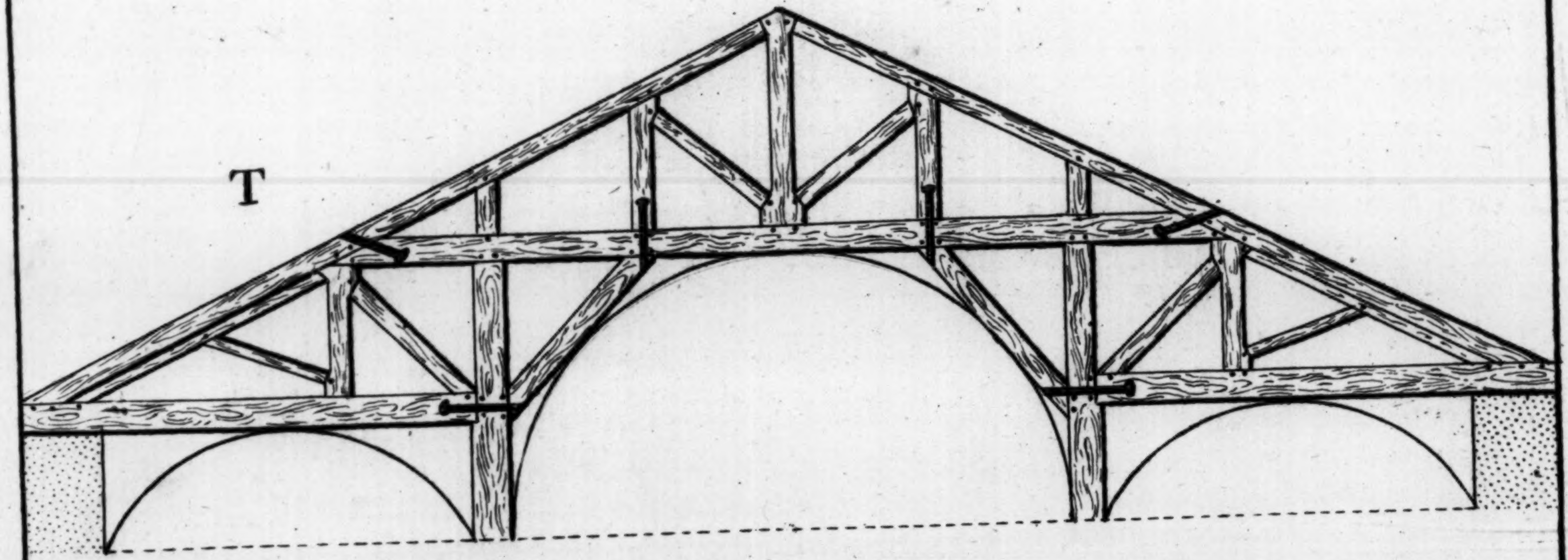
R



S



T



F. Price inv. et delin.

Toms ſculp.

MANY, perhaps, may be offended, to ſee that I ſhould deſcribe roofs ſuited to churches, ſeeing that ſo many have been done of late years.

However, as theſe differ in ſome reſpects from what has been done, I hope they will be acceptable to ſome of my readers.

In that of R, each opening is an ellipſis or oval, which has been approved on, by competent judges of the art, to be beſt adapted to ſuch uſes; and for its ſtrength, there ſeems to want little or no apology.

In that of S, each opening is an exact ſemi-circle, as it may beſt fall out to ſuit the windows; and, to my thinking, has not ſo great a bearing on the columns that ſupport it, as ſome that have been executed have had. Theſe may be adapted well to ſpan ſeventy or eighty foot without any difficulty.

In that of T, the middle part is a ſemi-circle, and the ſides are a ſegment, or part of a circle; but theſe may be varied at pleaſure. This truſs ſeems ſuited to ſpan a greater width than either of the others.

It may be ſaid of theſe and the foregoing, without oſtentation, that they have each a very juſt bearing, and are done with little ſtuff and labour. And as purlins, or bridgings, do not concern the ſtrength of the truſs, therefore I have omitted them, with this caution: If purlins are uſed, they ought to be agreeable in number to their ſupports; thus the truſs R, requires to have two tire of purlins, S, three, and T, four, which if bridged needs not be regarded.

As to the ſcantlings of timber, I ſhall refer you to the inſpectional table, at the end of this treatiſe, both for theſe and the foregoing truſſes, as well as thoſe in the PLATES that follow.

PLATE M*, N*.

MANY do not conceive what I mean, by inſerting this Plate in the firſt impreſſion with ſo little explanation, which was done that I might not give offence; therefore whoever takes amiſs my inſerting it, and making remarks on the ſtrength of the truſſes, will, I am perſuaded, pardon me, on account of the neceſſity that appeared for my ſo doing; having always had recourſe to experience, without which no perfection can be attained to. As to my repreſenting but the half of each truſs, 'twill make them the more handy to compare to one another.

That of U, was compoſed from inſpecting duly the roof W; which was firſt placed on the building without the parts thus * marked, they having been ſince put there to render the truſs capable of ſupporting the weight of the covering.

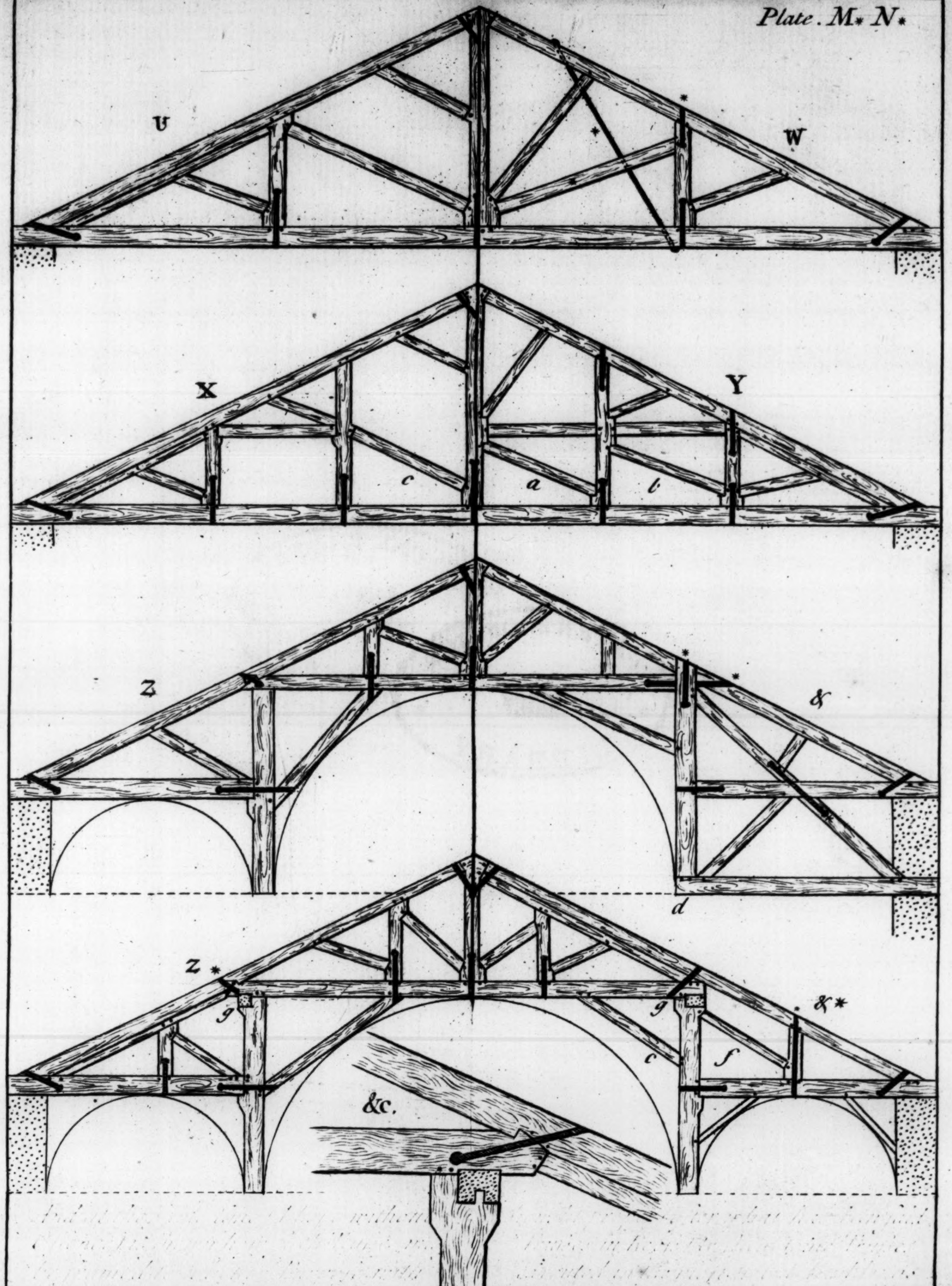
That of X, was compoſed from inſpecting the roof Y; whoſe braces a, b, are placed the wrong way; therefore c, does the intended office of both; tho', I confeſs, the roof could not have ſagged ſo much as it does, were it not for the ſhrinking of the timber, which is already ſufficiently mentioned in the foregoing paragraphs.

That of Z, was compoſed from inſpecting the roof &, whoſe timbers are ſo ill placed, as to require almoſt as many pieces of iron marked thus *, as there are pieces of timber, or it would ſcarce ſtand; indeed as it is, there lies a prodigious weight on the columns, as at d; and yet this truſs has abundance of timber in it, which plainly ſhews that it is not the abundance of timber, that makes a truſs ſtrong; therefore the art lies in connecting it together.

That of Z*, was compoſed from inſpecting the roof &*, which has no material fault, otherways than a miſapplication of the braces e, f; eſpecially the latter, as may be ſeen by the iron*.

N. B. The poſts g, g, have ſomething very particular in their uſe, which perchance inſpection of &c. may make clear.

Plate. M* N*



F. Price inv. et delin. These truſses are executed in noted Buildings. Toms ſculp.

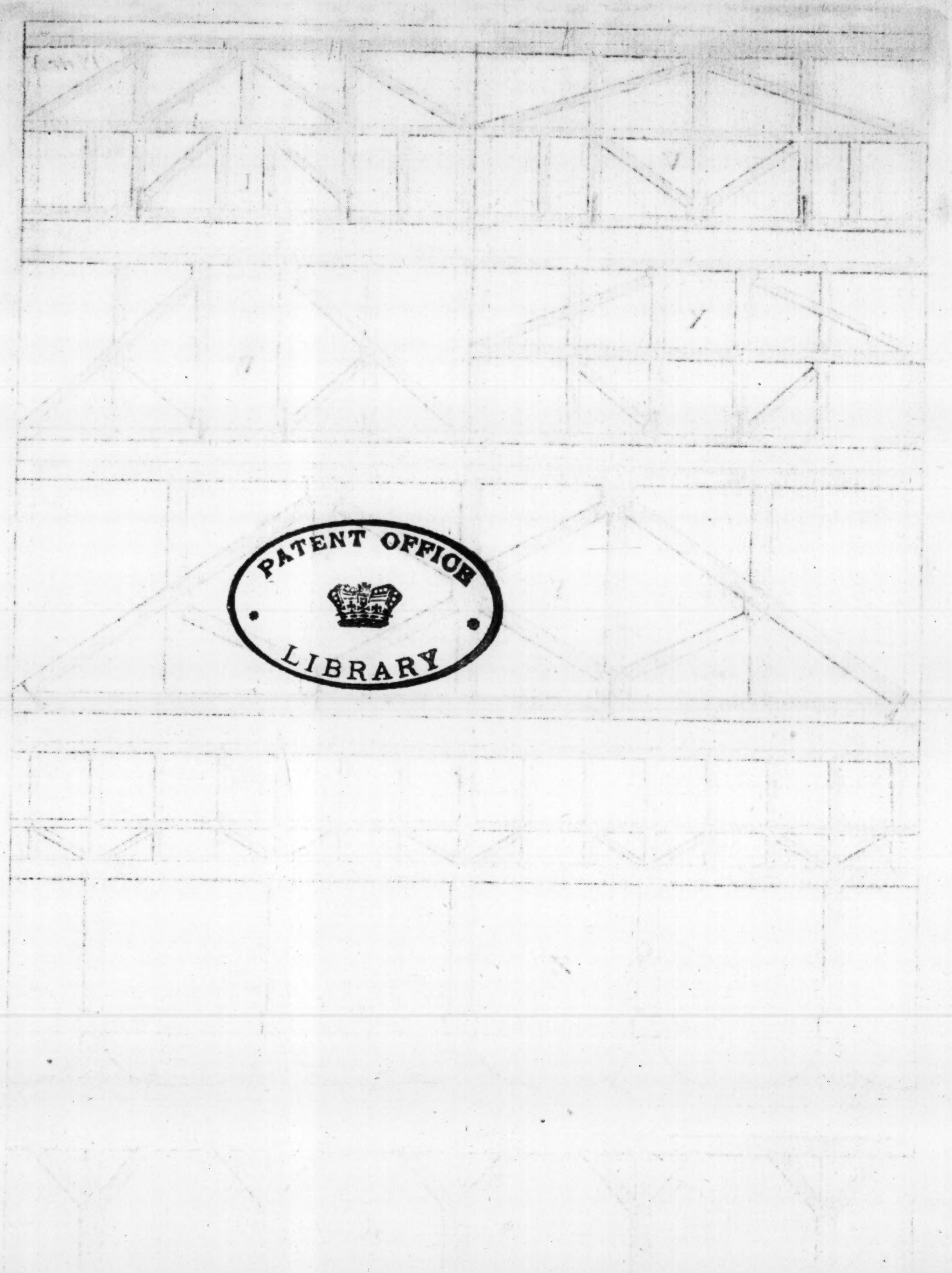
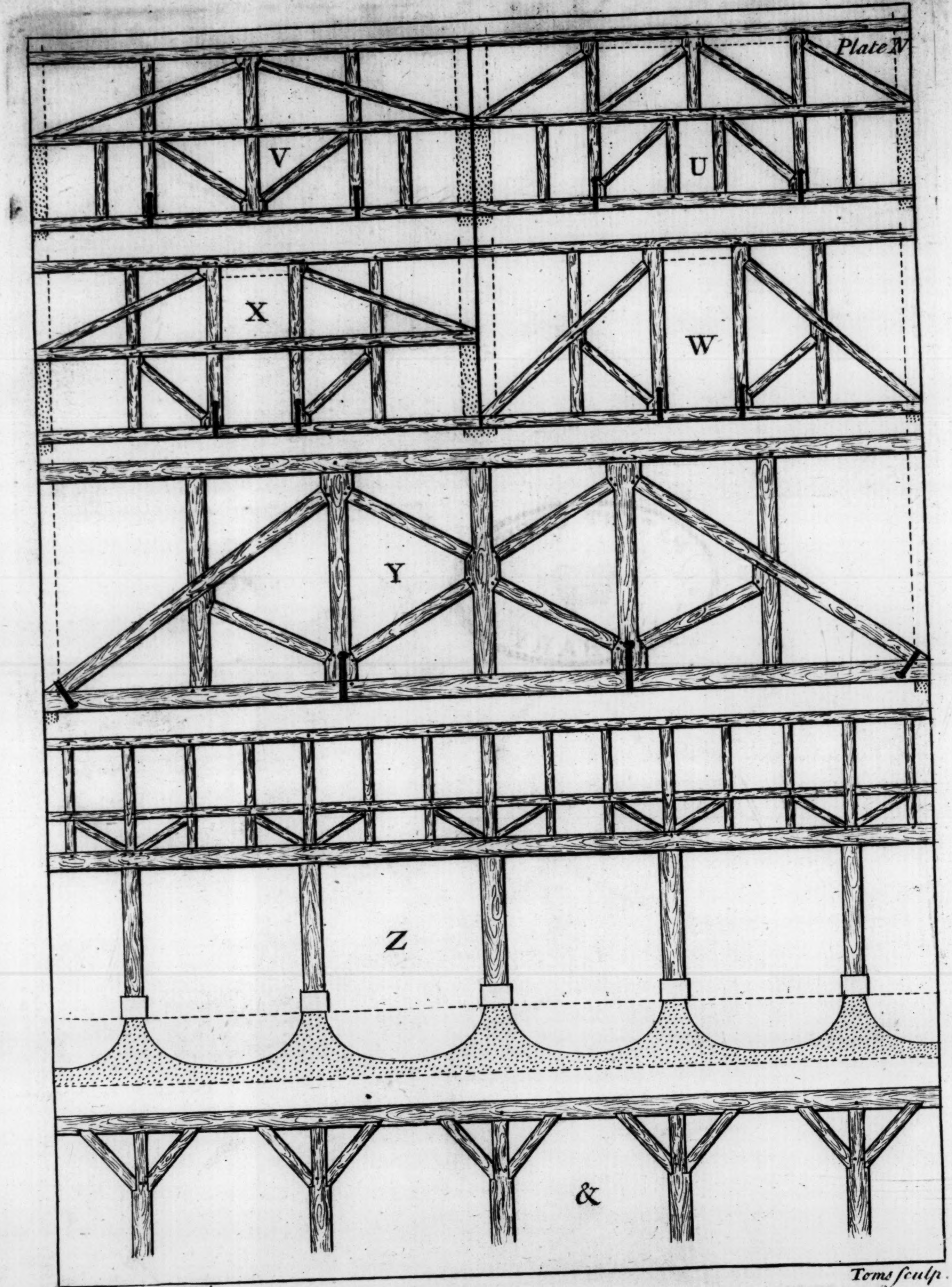


Plate IV



F. Price inv. et delin.

Toms ſculp.

NOTWITHSTANDING what has been ſaid of truſſes in roofs, thoſe of partitions vary from them in ſome parts, on account of their having door-ways, which interrupt their tye or ſupport, as here in halving ſome timbers together, that is, letting one into the other, half the thickneſs of each, ſo that both the ſides are even or fluſh; and which I would never adviſe, without neceſſity require it; becauſe this method weakens the timber, and renders it leſs capable of ſupport; although if uſed as a tye, 'tis weaken'd but little.

In V, is ſhewn a partition, ſuppoſed to be between rooms, in which door-ways are wanted, as towards each wall. And here the inter-ties, and king-poſt, and prick'd poſts, muſt be halved together, but not the braces, on no terms, they being the chief ſupport.

In U, is alſo a partition between rooms, having three door-ways, one in the middle, and one to each wall. This alſo muſt be halved together; that is, the two king-poſts and inter-ties, but the braces are whole.

In W, and X, are ſhewn two more partitions, with door-ways in them. And this method I approve; becauſe if neceſſity require it, when the building is ſettled, you may raiſe the partition in the middle with ſhores, and by driving in freſh ſtruts yet longer, as the prick'd lines ſhew, you may keep it to its proper height.

In Y, is a partition ſuppoſed to bear a gutter, (or girders, on each poſt;) or may bear a wall, by having timber in proportion to its uſe.

In Z, is ſhewn the manner of a timber front, ſuppoſed to be open underneath in form of an arcade. And for ſuch open fronts, the foundation ſhould be laid in reverſed arches, which will ſtrengthen it very much; by this means, the ground bears between one poſt or pillar, and the other, as well as under the ſame.

If on it you would have brick-work, or even ſtone, then ſupport the breaſt-ſummer, as is ſhewn in &: Which manner of framing renders it as ſtrong between the poſt, or pillars, as it is directly on the ſame. And this ſeems ſufficient to explain proper bearings for partitions.

PLATE N*, O*.

NOT only partitions, but bridges, require timber to be halved together; more eſpecially ſuch as extend a conſiderable length. And becauſe theſe timber-bridges have never been intelligibly explain'd, as to the connection of their timbers, therefore, I hope, the following will be kindly received.

Let A*, be the plan, ſuppoſed to extend any length not exceeding one hundred feet, nor twenty four feet in width; alſo let B*, be the ſide, or upright of the ſame; and let C*, be the ſection of the ſame by a larger ſcale.

Leſt every one ſhould not conceive the particulars by inſpection, obſerve in A*, that a, a, a, a, are the butment, or ſupport to each ſhore; and let b, b, be the tying-beams; which are halved into the poſts; alſo let c, c, be the bearing-beams; and let d, d, d, d, be the binding-joiſts, which are let into the bearing-beams, (*as ſhewn in* PLATE C*, D*, *at* T*); alſo let e, e, e, e, be the plan of the ſeveral king-poſts.

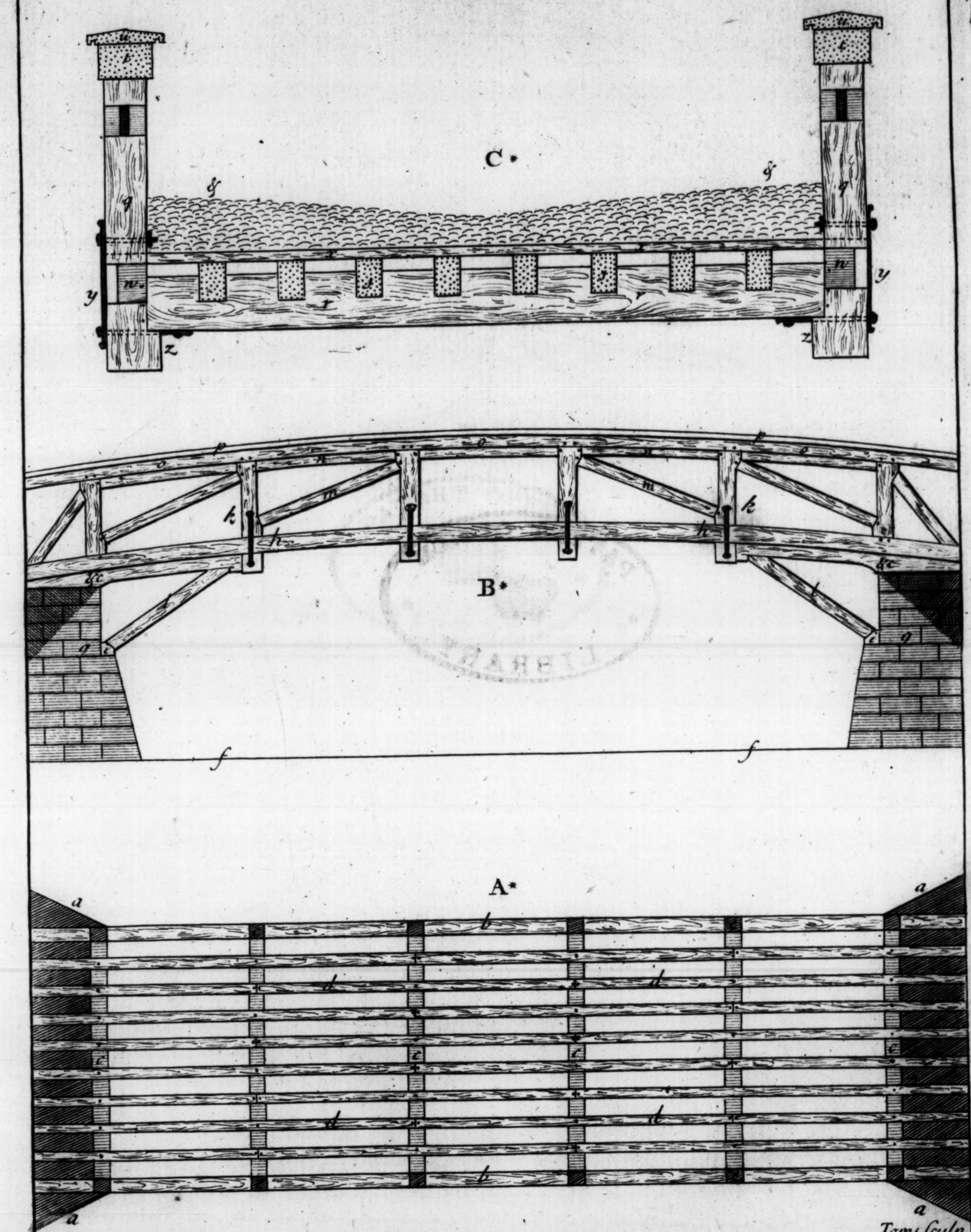
And in B*, obſerve that f, f, is the top of the water, at its common level, and let g, g, be the butments, or ſupport to each ſhore; alſo let h, h, be the tying-beam, as halved into the poſt; let i, i, be the plate for the braces, l, l, to reſt on, which ſupport the poſts k, k; ſo do the braces m, m, diſcharge the whole weight; alſo let n, n, be ſtruts to help the ſtrength, as by butting againſt each brace; let o, o, o, be the top-plate, or rail, and p, p, a plank weathered to throw the water.

N. B. *The additional beams*, &c. &c. *do add prodigiouſly to its ſtrength.*

And in C*, which is the ſection by a larger ſcale, let q, q, be the poſts, and r, r, the bearing-beam, framed therein, and let s, s, be the binding-joiſts; alſo let t, t, be the top-rail, being wider than the reſt to preſerve the joynts the better; and let u, u, be the ſaid plank weathered to throw the water off yet better, as at w, w. It is neceſſary to let the tying-beam into the poſts, a ſmall matter, becauſe the plank x, x, bears on it as well as on the binding-joiſts; let y, y, be ſtraps of iron bolted through the poſts, in order to ſtrengthen the ſame; the lower bolt goes through the ſaid ſtrap, and comes under the bearing-beam, and which with the joggle z, z, preſerves a good bearing for the beam, which ought to be truſs'd, as ſhewn in PLATE B; and &, &, is the gravel, and paving.

To preſerve the timber the better, let the truſs B*, be boarded on each ſide.

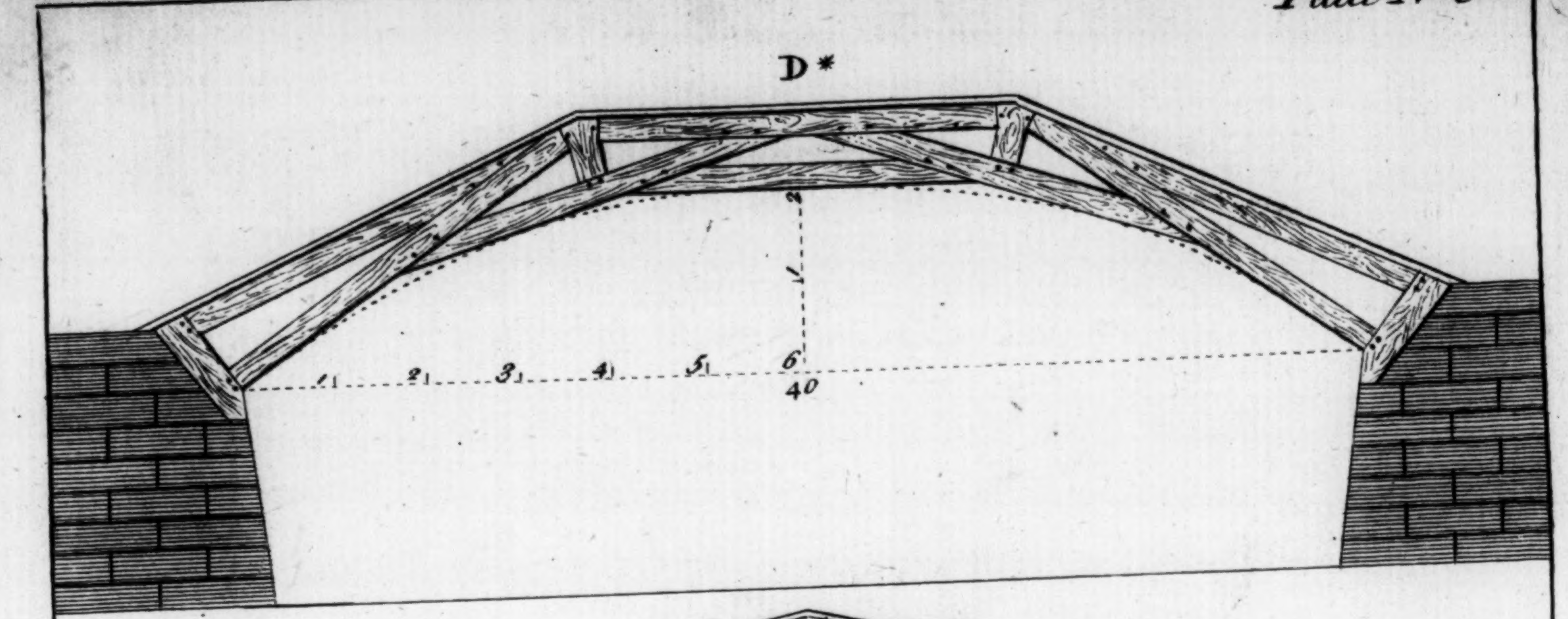
Plate N.° O.



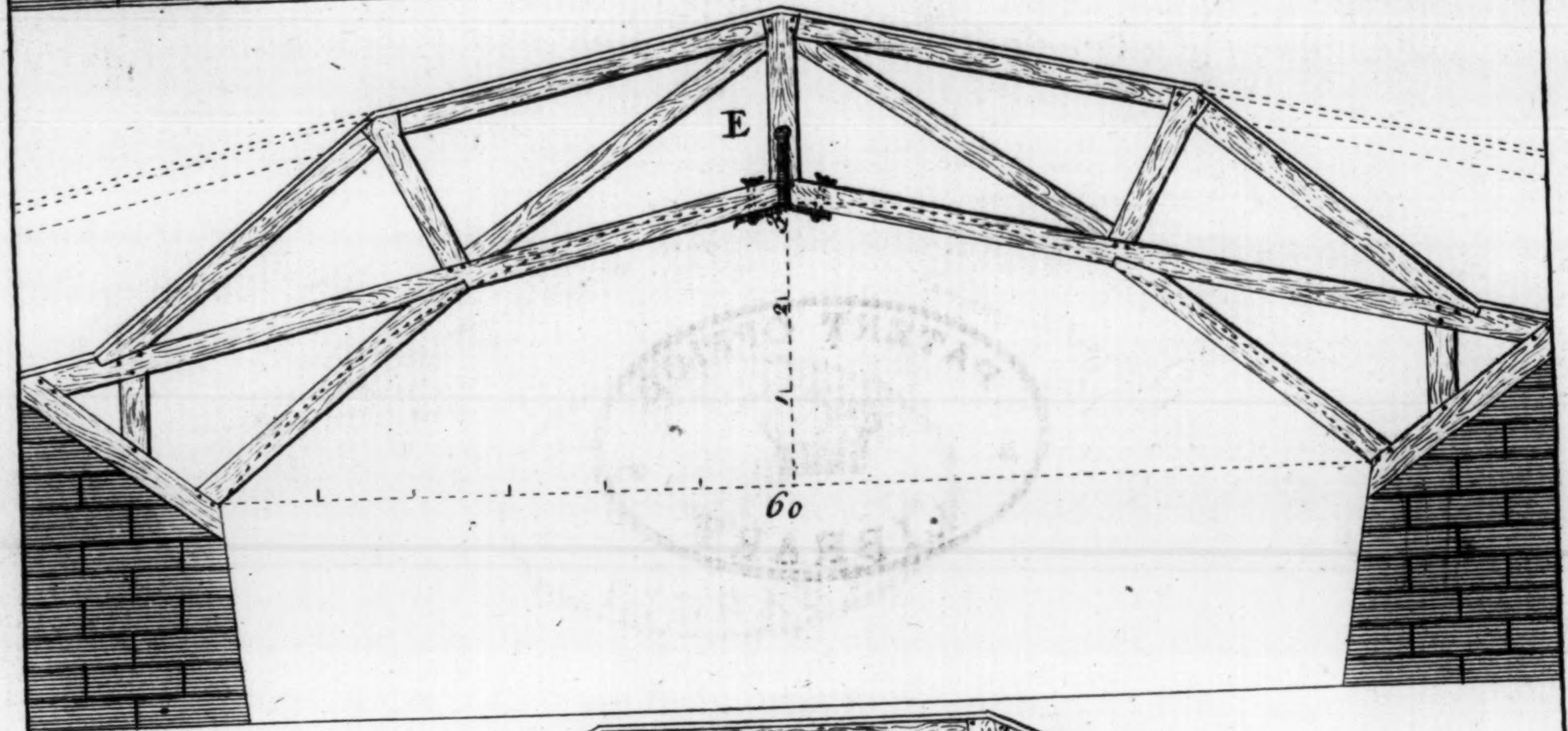
F. Price inv. et delin.

Toms sculp.

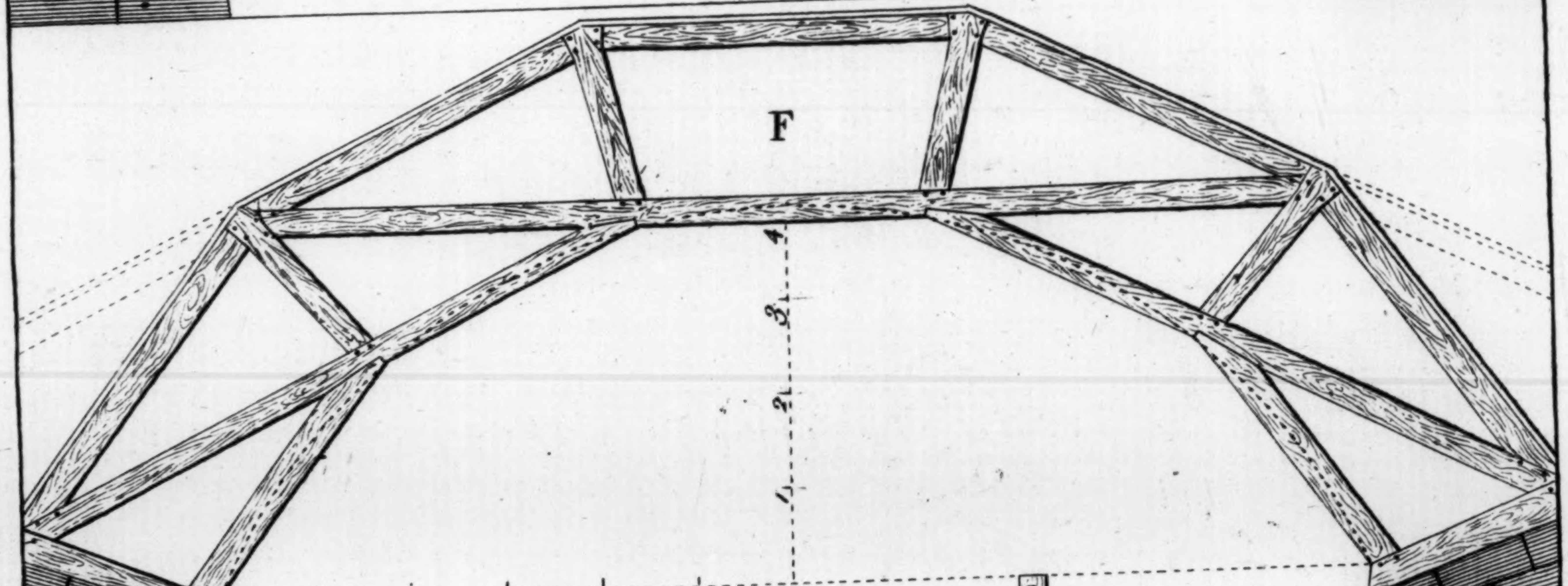
D*



E



F



F. Price inv. et delin.

Toms sculp.

NOT only over rivers, but alſo over hollow roads, theſe timber bridges, in form of an arch, may be extreamly uſeful; and tho' they may be ſaid to riſe too high for paſſage of carriages, *&c.* theſe are ſo made as to ſuit with the various uſes they may be applicable to; the upper part not requiring ſo quick an aſcent, as the lower part has, which affords the greater ſtrength; the upper part may be made as the prick'd lines ſhew, and become a help to the paſſage, ſo that cattle may the eaſier draw a heavy load over.

There be many parts of *England*, as well as other places, that abound with hollow roads, which interrupt gentlemen from going with pleaſure to tranſact their affairs, *&c.* or even to do what is neceſſary to their reſpective eſtates, or their pleaſures, which might at a ſmall expence be accommodated by one of theſe timber bridges; eſpecially that of D*. And as theſe bridges are ſo adapted, as to ſerve either forland or water, their uſe becomes the more extenſive.

As to what relates to the ſoundneſs of their foundation, or ſpringing, no rule can be fixed, one being obliged to vary that part, as occaſion or conveniency require; ſuch as ſometimes to have ſtone butments; at other times to have piles drove down, and aſſiſted with brick or ſtone piers; always obſerving circumſtances that naturally occur, from a ſerious ſurvey of the place they are to be executed in.

That of D is ſuited to a hollow way, or river of thirty, or forty feet wide, and riſes one ſixth of its width. That of E is ſuited to a place of fifty, or ſixty feet extent; and riſes one fourth of the width of the place; that of F* is prepared to extend yet farther, and riſes one third of the width of the place; which width I ſuppoſe to be ſeventy, or eighty feet, and may be executed without the leaſt difficulty; that of G* is the ſection of either; thus I think to have adapted them to all manner of places that may happen.

N. B. The foregoing Plate being ſo fully explained, I think theſe can want no more than what has been ſaid.

PLATE N*, O***.

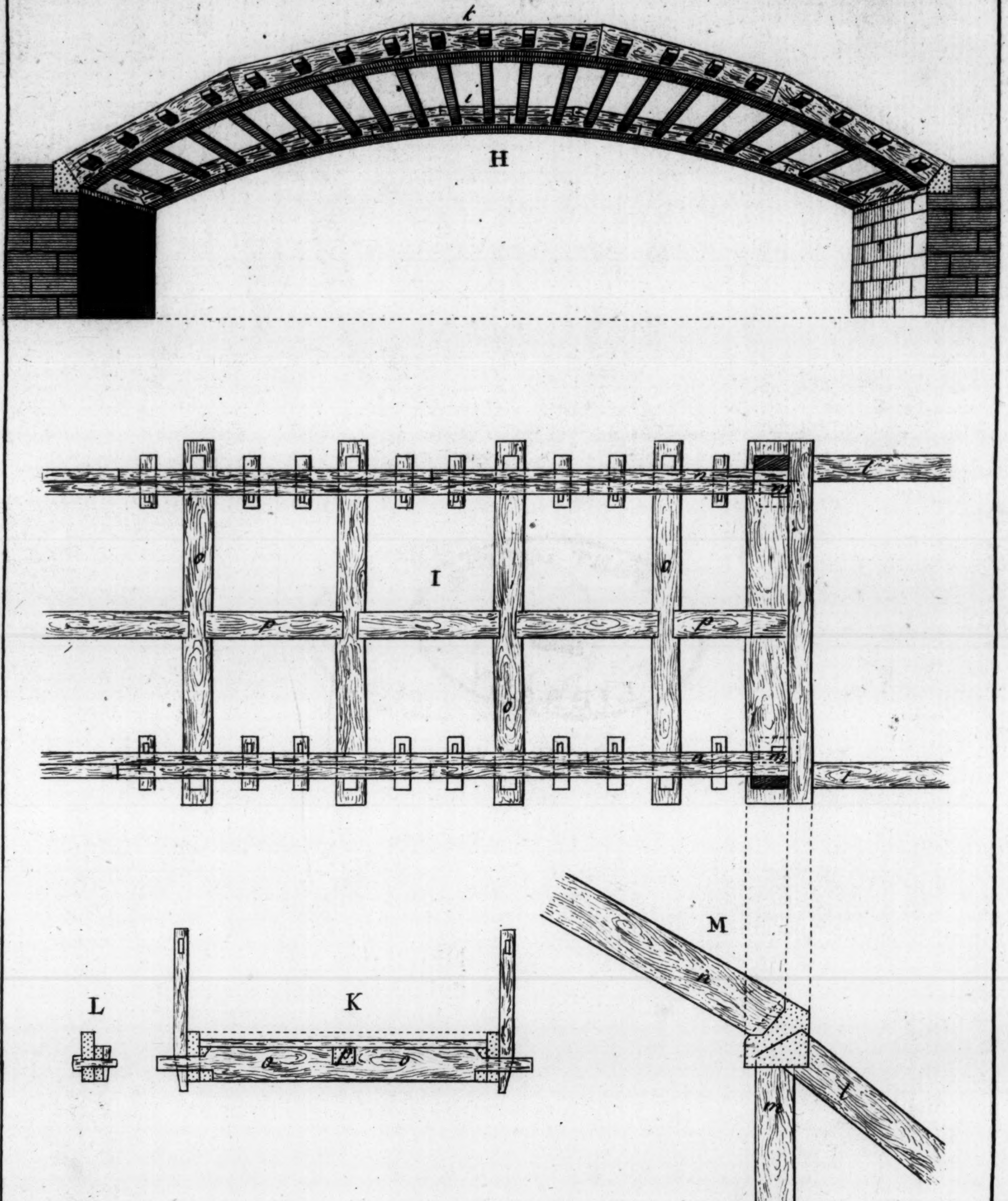
NO other perſon having taken notice of theſe particulars, therefore I have inſerted a bridge that may be more acceptable than the foregoing ones, becauſe it is adapted to publick and private uſes, by being ſo formed of ſmall parts, that it may be carried to any aſſign'd place, and there put together at a ſhort notice.

This bridge H, I ſuppoſe to conſiſt of two principal ribs, as i, k, made thus; the width of the place is ſpan'd at once by an arch riſing one ſixth part of its extent; its curve is divided into five parts, which I purpoſe to be of good ſeaſoned *Engliſh* oak plank, of three inches thick, and twelve broad; their joynt or meeting tends to the center of the arch; within this rib is another, cut out of plank as before, of three inches thick, and nine broad; in ſuch ſort as to break the joynts of the other. In each of theſe ribs, are made four mortices, of four inches broad and three high, and in the middle of the ſaid nine inch plank, (theſe mortices are beſt ſet out with a templet, on which the ſaid mortices have been truly divided and adjuſted;) laſtly, put each principal rib up in its place, driving looſe keys into ſome of the mortices, to hold the ſaid two thickneſſes together; while other help is ready to drive in the joiſts, which have a ſhoulder inward, and a mortice in them outward; through which, keys being drove, keeps the whole together; on theſe joiſts, lay your planks, gravel, *&c.* ſo is your bridge compleat, and ſuitable to a river, *&c.* of thirty-ſix feet wide.

In caſe the river, *&c.* be forty or fifty feet wide, the ſtuff ſhould be larger, and more particularly framed; as is ſhewn in part of the plan enlarged as I; theſe planks ought to be four inches thick, and ſixteen wide; and the inner ones that break the joynts, four inches thick, and twelve broad; in each of theſe are ſix mortices, four of which are four inches wide, and two high; through theſe are drove keys, which keep the ribs the better together; the other two mortices are ſix inches wide, and four high; into theſe are framed the joiſts, of ſix inches, by twelve; the tenons of theſe joiſts are morticed to receive the poſts, which ſerve as keys; as is ſhewn in the ſection K, and the ſmall keys are ſhewn as in L; all which inſpection will explain. That of M, is a method whereby to make a good butment in caſe the ground be not ſolid; and is by driving two piles perpendicularly, and two ſlopeing; the heads of both being cut off ſo as to be embraced by the cill, or reſting-plate; which will appear by the prick'd lines drawn from the plan I, and the letters of reference.

All that I conceive neceſſary to be ſaid farther is, that the whole being performed without iron, it is therefore capable of being painted on every part, by which means the timber may be preſerved; for though in ſome reſpects iron is indiſpenſably neceſſary, yet if in ſuch caſes where things are, or may be often moved, the iron will ruſt and ſcale, ſo as that the parts will become looſe, in proceſs of time; which, as I ſaid before, if made of ſound timber will always keep tight and firm together. It may not be amiſs to obſerve, that whereas ſome may imagine this arch of timber is liable to give way, when a weight comes on any particular part, and riſe where there is no weight, ſuch objectors may be ſatisfied that no part can yield, or give way, till the ſaid ſix keys are broke ſhort off at once, which no weight can poſſibly do.

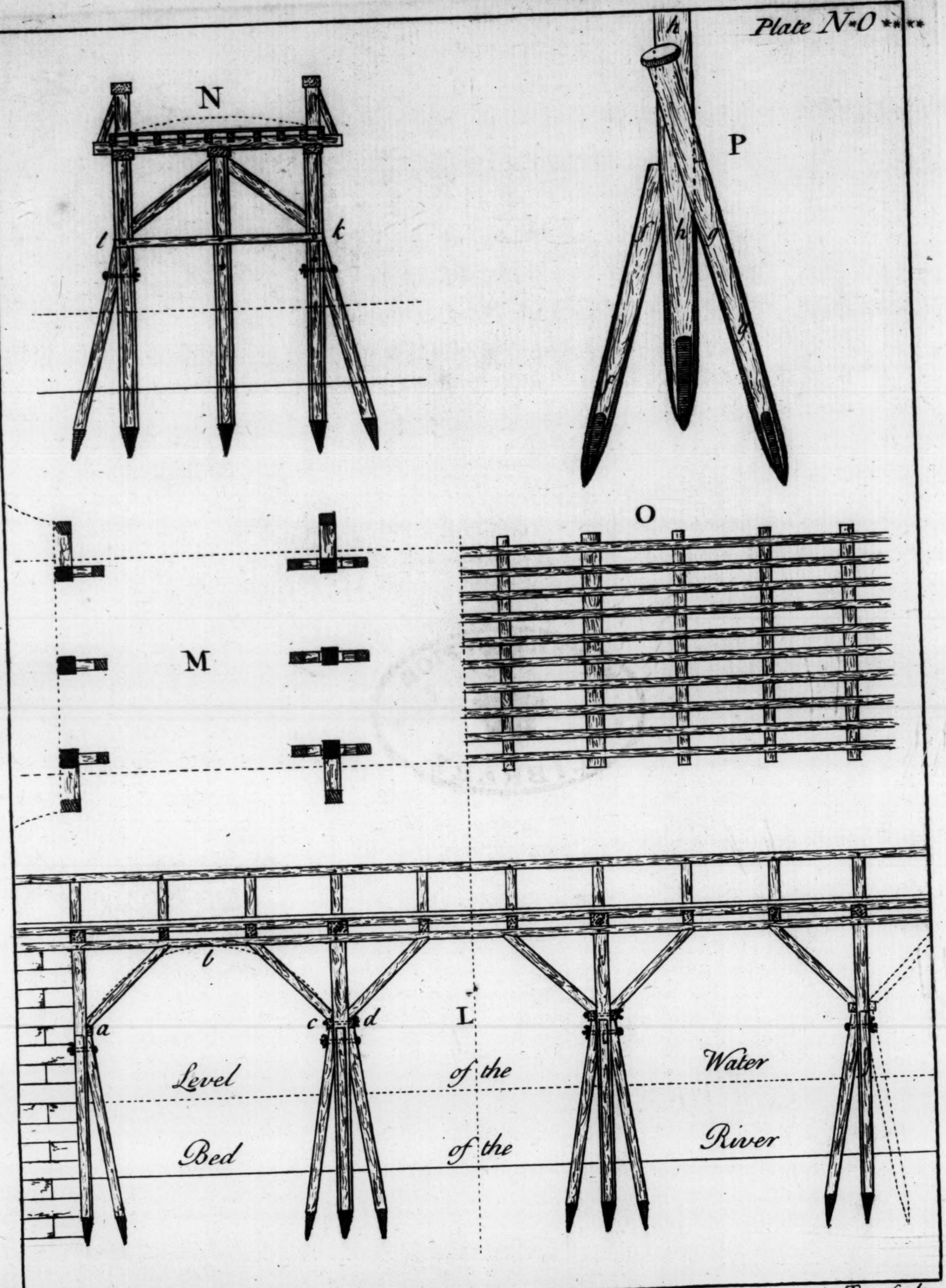
Plate Nº O***



F. Price inv. et delin.

Toms sculp.

Plate N.O *****



F. Price inv. et delin

Toms sculp

PLATE N*, O****.

NOTWITHSTANDING the pains I have taken to deſcribe truſſes proper for timber bridges, the method of driving down piles, gives ſo general a ſatisfaction, and is indeed eſteem'd the ſafeſt kind of bridge; therefore I have drawn an example of one, not that it is leſs ſubject to caſualties, or leſs expenſive than thoſe whoſe dependence lies on a truſs; but becauſe rivers of a large extent may be accommodated with one of theſe bridges. At the ſame time it may be obſerved, that there is generally a fear poſſeſſes the ſpirits of ſome, who paſs over a truſs'd bridge, becauſe they cannot comprehend its ſtrength.

This bridge conſiſts of three arches, each riſing one third of its width, as a, b, c; the piles betwixt the arches are together one twelfth part of the opening, as c, d; the bridge L, may extend one hundred feet in length, and in breadth twenty; and in conſideration that piles are moſt ſubject to decay, at the top, or common level of the water, therefore the outer piles have four feet, or ſupports, and thoſe of the middle ones have three feet, or ſupports, as may appear by inſpecting the elevation L; the half of the plan, as M; and the ſection N; from all which it appears that the piles betwixt each arch, are in nuuber eleven; of which five ſupport the great beams d, d, *&c.* and three of them ſupport each of the ſmall beams e, e, *&c.* by which means the whole is divided into nine equal bearings; that of O is half the plan of the beams, and the joiſts laid on them, as was particularly clear'd in PLATE N*, O*; theſe ſmall piles, or braces, are drove down firſt, and cut off ſo as to receive the great ones; which when drove down, there is an iron bolt drove through them all, and is key'd, or ſcrew'd, by which means they are firmly connected together.

On the top of the three ſmall piles, or braces, that ſtand within the arch, is laid a beam, whoſe end is repreſented as at a, c, d; and which is alſo bolted thro' the large piles, as appears by the ſection; on this beam i, k, in the ſection, ſtands the braces that ſupport the beams e, e, *&c.* Any farther explanation ſeems needleſs, without it be the driving down the braceing piles, as in P; firſt drive down the pile, or brace f, f, which being cut ſo as to come cloſe to the great pile, and which gives an opportunity to drive down that of g, g, which is alſo cut off as the prick'd line ſhews; laſtly, the pile h, h, is drove down betwixt both, and theſe ſhould be bolted or ſcrew'd together, as before was obſerved; and this method admits of no objection, otherways than being liable to be injur'd by a great froſt, if executed where the tide has an influence; and even that may be remedied by breaking the ice, round about the piles.

PLATE O.

OF what has hitherto been deſcribed, nothing appears ſo beautiful when done, as domes, or circular roofs; and, as far as I can perceive, nothing has appear'd ſo difficult in doing. Therefore it will be proper to ſpeak ſomething of them.

Let B, repreſent a plan: In which let b, b, b, be the Plate on the ſuppoſed wall; and let c, c, c, be the kirb, on which ſtands a lanthorn, or cupola; alſo let a, a, a, repreſent the principal ribs.

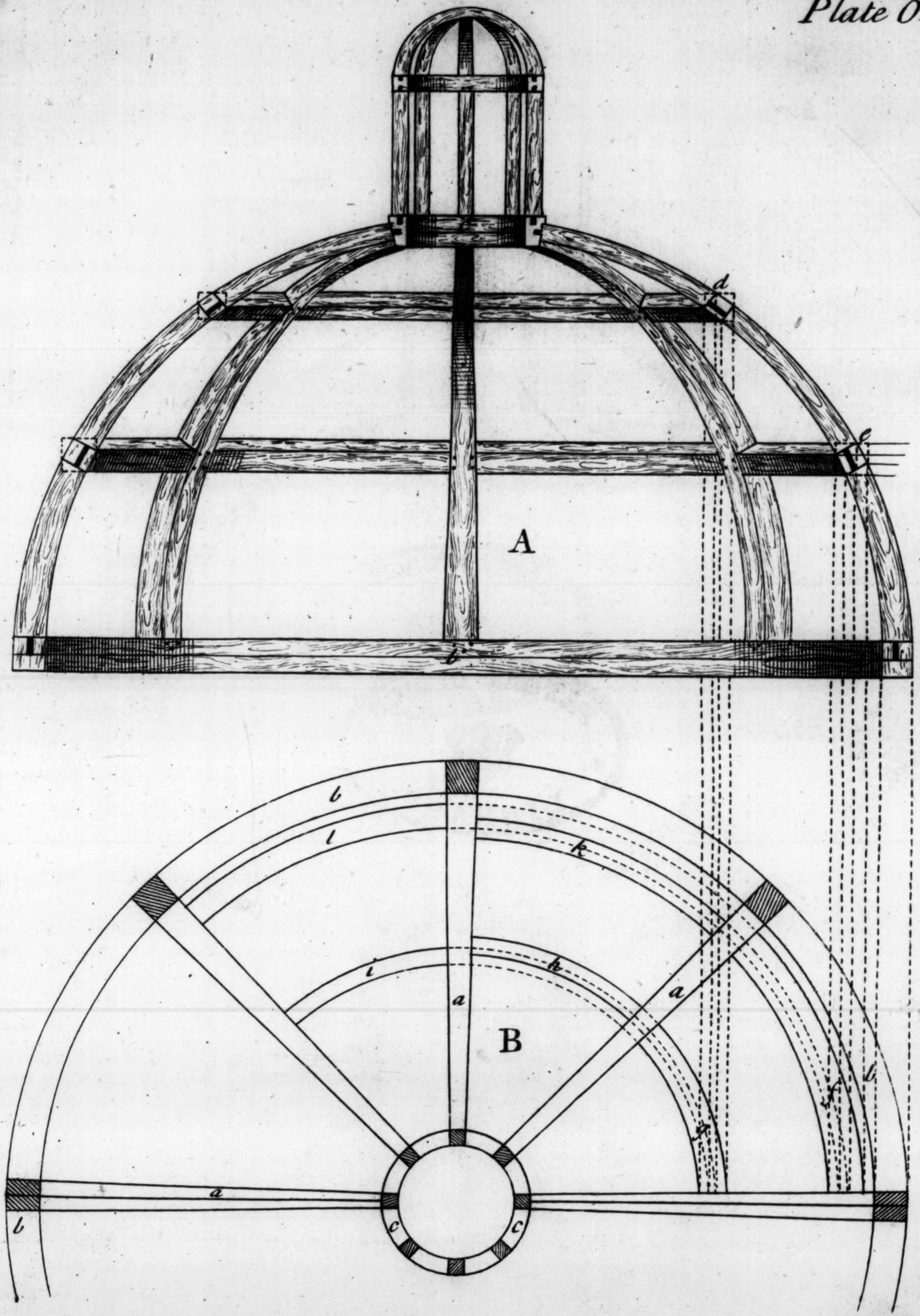
From the plan B, make the ſection A; in which the kirb, or Plate b, ſhould be in two thickneſſes; as alſo that of c; by which it is made ſtronger: And indeed the principal ribs would be much better to be in two thickneſſes. The beſt timber for this uſe is *Engliſh* oak, becauſe abundance of that naturally grows crooked. As to the curve or ſweep of this dome A, it is a ſemi-circle; altho' in that point, every one may uſe his pleaſure. And in it are deſcribed the purlins d, e, from which perpendiculars are drop'd to the plan B; ſo that f, is the mould the lower purlins are to be cut out by, before they are ſhaped or ſquared for uſe; and that of g, is the mould for the upper purlins. I rather ſhew it with purlins, becauſe under this head may be ſhewn the manner of framing circular roofs in form of a cone.

To ſhape or ſquare theſe purlins, obſerve in A, as at d, and e, they are ſo ſquared, that the joynts of the ſuppoſed ſmall ribs are equal. Obſerve, as at e, the corners of the purlin, from which the perpendiculars are let fall to the plan B. So that your purlin being firſt cut out of the thickneſs required, as appears in e; and alſo to the ſweep f; ſo that k, is the mould for the bottom, and l, the mould for the top; by which, and the lines from the cornets of the ſaid purlin e, the ſame may be truly ſhaped or ſquared.

N. B. This particular ought to be well digeſted, it being a principal obſervation in a circular roof.

And from the purlin d, in the ſection A, perpendiculars are drop'd to the plan B. And in which it appears that h, is the mould for the top, and i, the mould for the bottom; ſo may this alſo be ſquared, which completes the performance. As to other particulars, due inſpection will explain them. If any ſhould ſay, a dome cannot be done ſo ſafe without a cavity as uſual, let them view St. *Stephen's Walbrook*, *Stocks-Market*, built by that great architect Sir *Chriſtopher Wren*.

Plate O.



F. Price inv. et delin

Toms ſculp.

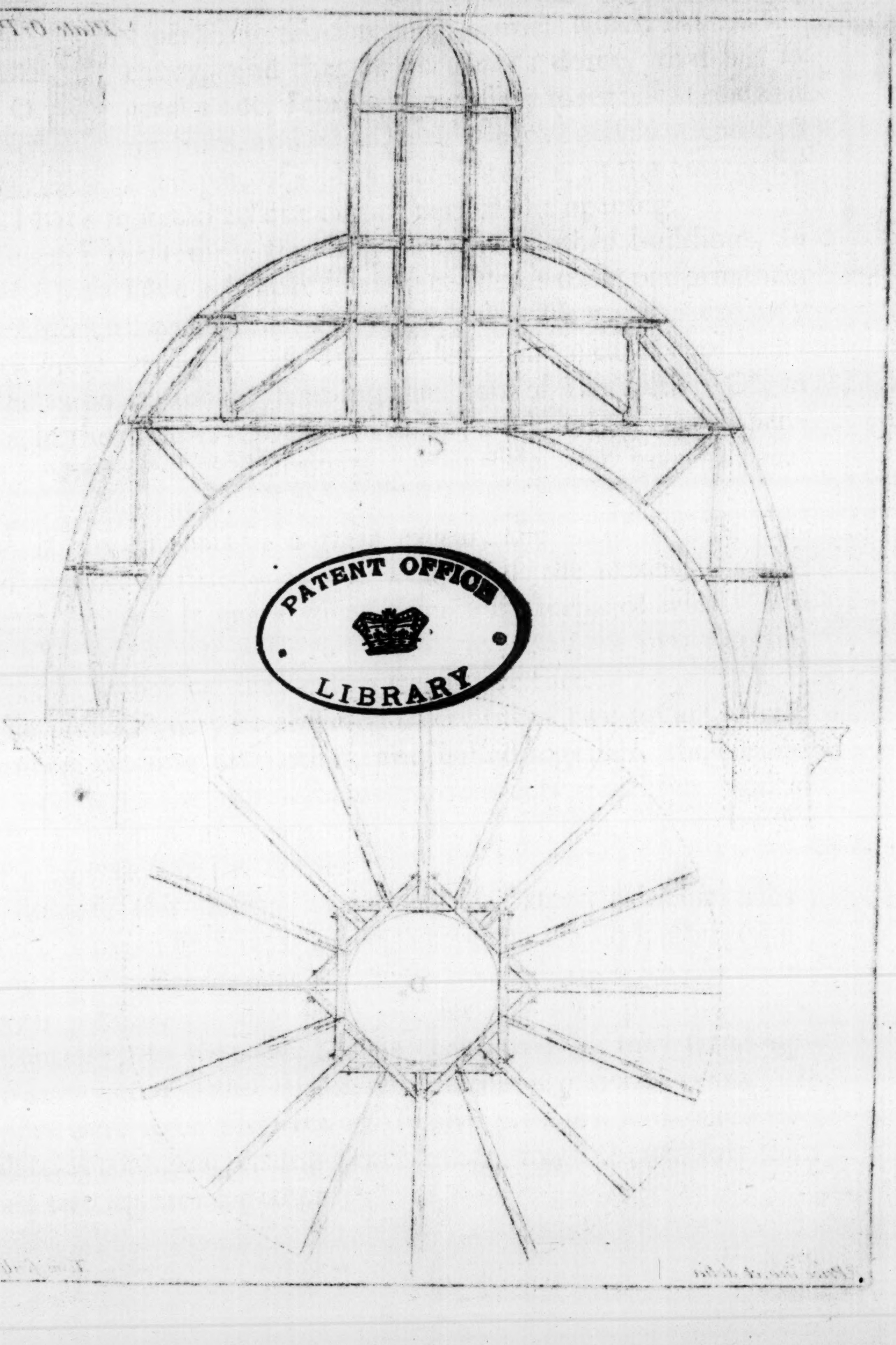


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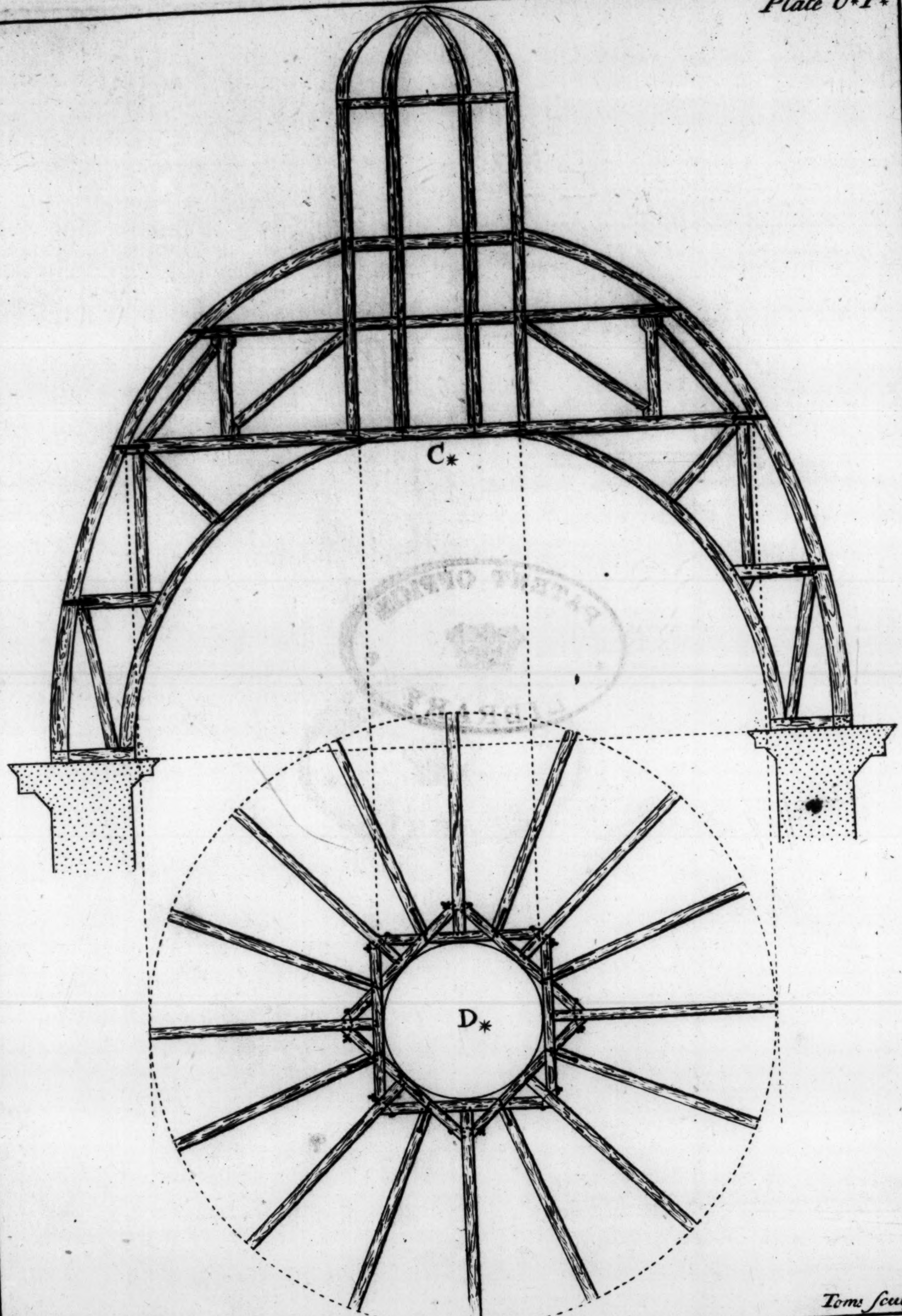
Plate O✱P✱



F.Price inv. et delin

Toms ſculp.

ON peruſing the foregoing dome, which has no vacancy, and that of St. *Paul's* dome, that has ſo great a one, I thought neceſſary to repreſent one at a medium, and which ſeems very conciſely adapted to a temple, of eighty feet diameter, in the clear; the walls I have repreſented one eighth part of the opening.

I ſuppoſe this temple ſtanding clear from other buildings, ſo that one may have a beautiful view of it; as to its performance, 'twas ſufficiently explained in the foregoing Plate; the vacancy gives a great ſtrength to it, and renders it more capable of bearing the cupola; for by framing that part of the ſection C*, as at a, a, in the manner repreſented in D*, it not only gives an opening for the light to illuminate the in-ſide, but gives a great ſtrength to the whole.

N. B. In all roofs of a great extent, the wind is to be prepared againſt as ſtrictly as the weight of the materials which cover it, becauſe it has ſo great a force in ſtorms of wind, and rain; that is, it acts with more violence than the materials do, they being, (what we may call) a ſteady preſſure.

The plan D* may be obſerved to conſiſt of two ſquare frames of timber, croſſing each other, and halfed together, the corners of which, and the interſections prove a very good tye, and at the ſame time is of a reſiſting nature; ſo that it becomes the chief connection in the dome.

I ſuppoſe this dome, to conſiſt of ſixteen principal ribs; which is a mean betwixt the foregoing one, which has but eight, and that of St. *Paul's*, that has thirty-two; this alſo may be framed with purlins, or may have ribs let into theſe principal ones, horizontally; ſo that the boards that cover it, may ſtand upright as it were; altho' I don't think that a material point. If the plan were to be prepared for twelve principal ribs, then two equilateral triangles, croſſing each other, might better ſuit than to half two ſquares together.

ON St. *Paul's* church ſtands this dome, a laſting monument of the extenſive knowledge of Sir *Chriſtopher Wren.*

As the ſection of the timber-work relates chiefly to this treatiſe, and which by mature conſideration I find artfully contrived, therefore it might ſeem negligence not to oblige the publick with it; I ſhall not mention the ſtrength, &c. of the brick, and ſtone, that form the other parts of it, becauſe it would fill a ſmall eſſay to give a particular account thereof. I ſhall thereſore give ſome explanation of theſe parts, as deſcribed on the Plate.

That of E, is a dome turned over with bricks; which were made on purpoſe, of two feet in length, which is plaiſtered and painted in a moſt beautiful manner, by the late Sir *James Thornhill.*

That of F, is a cone of bricks, being one foot ſix inches in thickneſs, and is alſo plaiſtered, and painted, and is ſeen through the opening e, e.

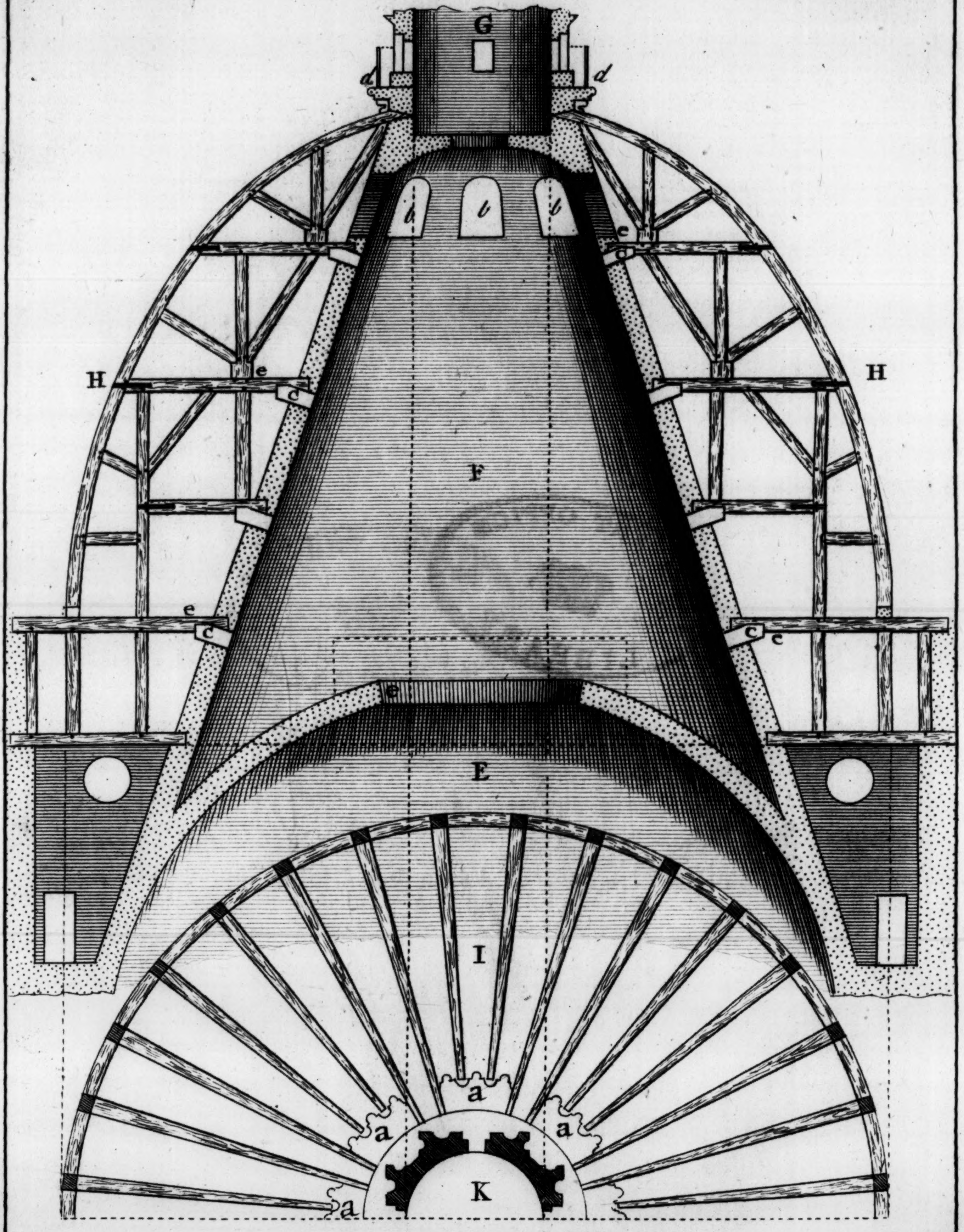
That of G, is part of the cupola, which is of *Portland* ſtone, and is twenty one feet diameter, and near ſixty four feet high; and chiefly ſupported by the ſaid cone F; though it is mutually aſſiſted by the timber-work H, H, both which are curiouſly tyed together with iron cramps, that are run with lead into the ſtones, c, c, c, &c. and then bolted through the hammer beams e, e, &c. ſo that by the ſtone being work'd into, and with the brick-work, it becomes like a dovetail. Through this ſection, (that is, between the timbers) a pair of ſtairs leads to the top of the dome, on a balcony as d, d, from whence you have a moſt beautiful proſpect.

That of I, is half the plan of ribs H, which are interrupted as at a, a, a, &c. to give light to the windows in the cone F, as at b, b, b; there are thirty two ſingle truſſes as at H, which form the dome.

That of K, is half the plan of the ſaid cupola.

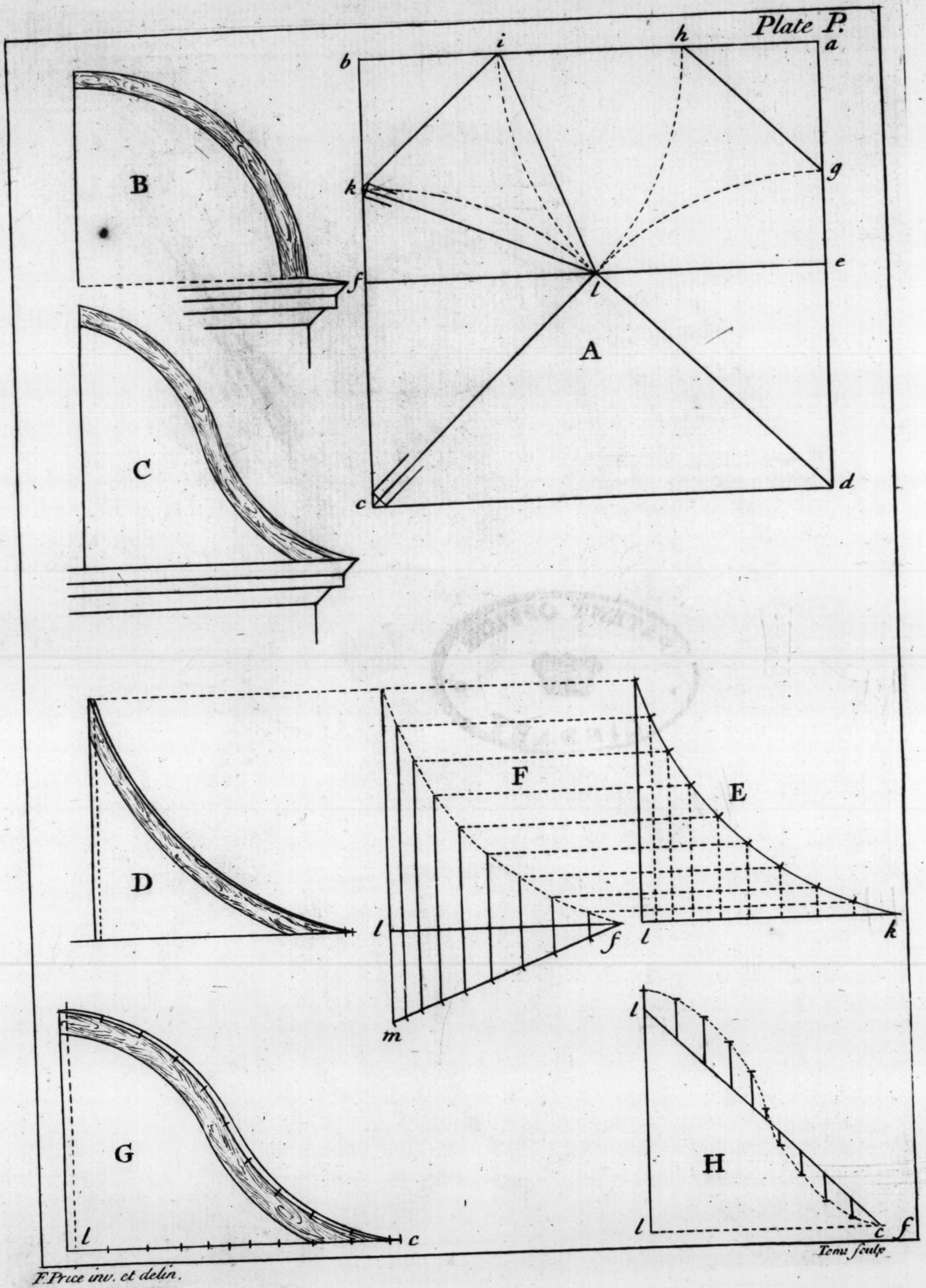
By this time I think nothing material has been neglected to be mentioned, except it be that this dome has not purlins in it, but is prepared with ſmall ribs that lie horizontally; ſo that the boards that are nailed thereon, ſtand as it were upright. In ſo large a work, theſe ſaid ribs have no occaſion to be ſhaped as ſhewn in Plate O, but are placed ſo as that their ſides tend to the center of the dome, and which gives the center for their proper ſweep, or curve.

Plate O*P**



F. Price delin. *taken in the Year 1733* Toms sculp

Plate P.



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F. Price inv. et delin.

Toms sculp

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PARTICULAR obſervations on the manner of covering lanthorns, or cupolas.

Let A, be a plan, the upper part of which is made half an octagon, by PROPOSITON S.

It is obſervable, that a circular roof, as B, ſhould extend no farther than the upright of its ſupport, and there made ſo as to carry off the water; whereas an O G roof, as C, may extend to the extremity of the cornice, without injury to its ſtrength, or offence to the eye of the moſt curious. Alſo a hollow roof, as D, may extend to the extremity of the cornice.

It appears to me, that the many angles of a cupola give it beauty; therefore the ſweep E, is a regular curve, the baſe line l, k, being taken from the angle of the octagon in the plan A, as at l, k. This curve E, is divided into a number of equal parts. In order to trace the common rib F, from the ſaid angular rib E, obſerve in A, the baſe of the common rib f, l, which is placed in F, as from l, to f; continue the perpendicular l, at pleaſure; take the baſe l, k, in E, on which are the perpendiculars drop'd from the curve, and obſerve to place that diſtance k, l, in E, from f, in F, to any part where it cuts the perpendicular l, in F, as at m; from thoſe diviſions raiſe perpendiculars. So by continuing baſe lines, from the diviſions in E, to theſe perpendiculars in F, their interſection, or meeting, is a curve or ſweep exactly agreeable; and which indeed may ſerve as a ſtandard rule to trace any moulding whatever.

To back the ſaid angular bracket D, obſerve to deſcribe the thickneſs of it on your plan, as in A, at k; which ſhews how much your mould muſt be ſhifted, as may appear in D. This alſo may be obſerved to be a general rule for the backing of any bracket.

In G, is the angular bracket of an O G roof, taken from the plan A; as at l, c. And H, is the common rib, or bracket l, f, traced from G, as above is ſhewn. As alſo the manner of backing the hip G, which muſt of courſe appear by inſpection.

PLATE P*, Q*.

PERCHANCE I may be accuſed with neglect, if I don't give ſome account of curvilineal roofs of a great extent, having given ſome general hints of ſmall ones in the foregoing Plate, therefore I have inſerted theſe three ſections of them, to ſhew how firm they may be made. The chief difficulty to ſtruggle with, is the plan of the roof; which ought to be ſo contriv'd that the preſſure of the truſſes may not thruſt out the Plates; in order to which, the beſt way is, by halving two triangles of timber together, croſſing each other; or two ſquares, and by bolting the points of each, through the plate, or kirb; the plan being a circle. Indeed dovetailing them down, may be ſufficient to prevent its flying out by the preſſure.

N. B. This may be better conceived by inſpecting the Plates O* P*, and P* Q**.

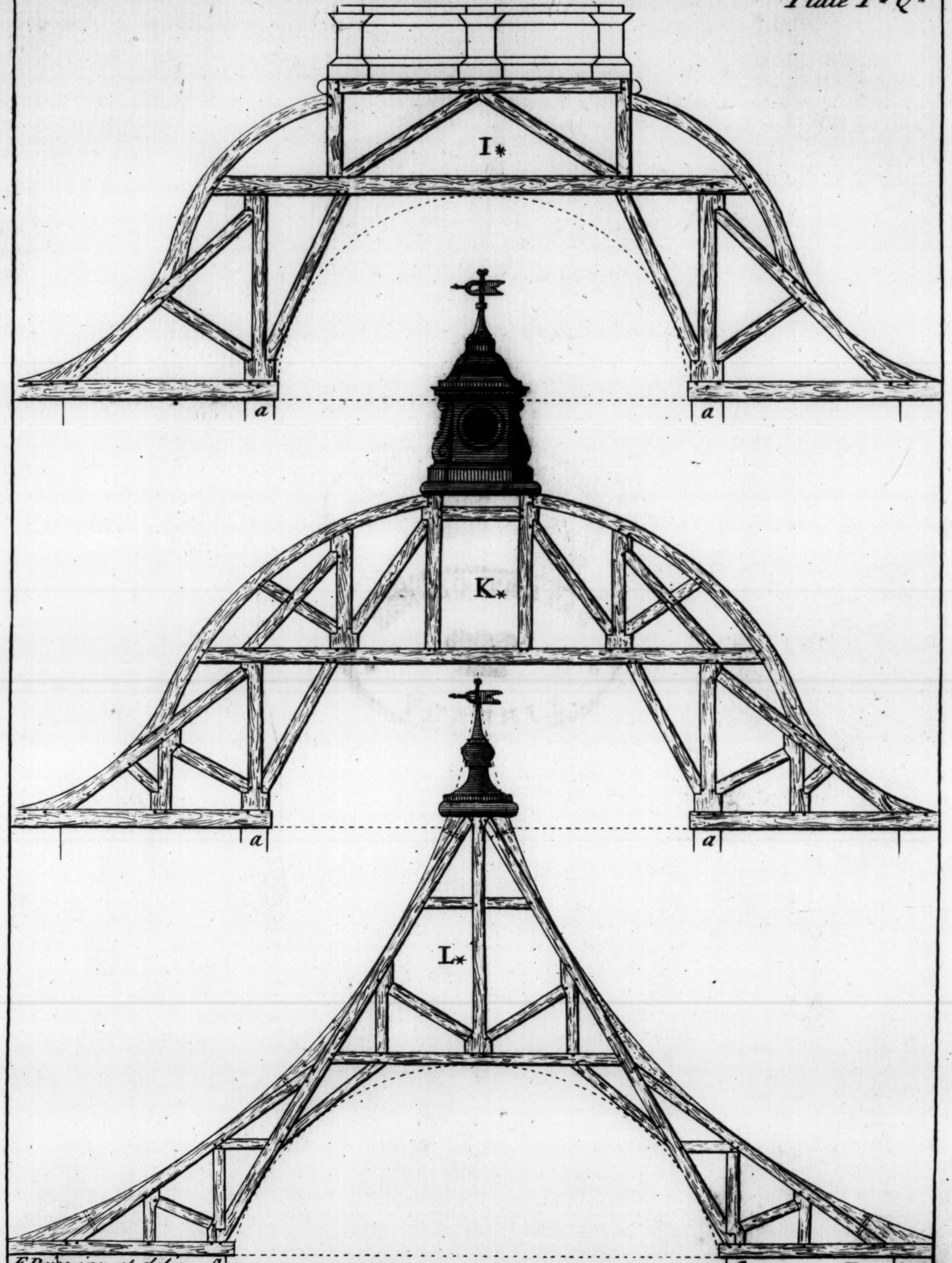
That of I*, is prepared to bear a balluſtrade, ſuch as may ſuit the middle part of a building; if it riſe above the reſt, ſo as to command a proſpect.

That of K* is ſuited to a round temple, *&c.* and in execution will have the appearance of a dome; becauſe the hollow part at bottom will not be perceiv'd, it being ſo ſmall; at leaſt if it be, 'twill be no defect; the cupola on it may ſerve for a clock to ſtand in, as having the advantage of being ſeen at a diſtance, or it may ſerve to illuminate the inſide; each of theſe are prepared to be ſupported by columns, as at a, a.

That of L* may ſerve alſo to cover a round temple, and by its being hollow in itſelf, may give the more variety, if it ſtand diſengaged; each of theſe, if uſed on a circular plan, muſt be performed by the rules laid down in Plate O; but if they were to ſtand on an octagon, or any regular polygon, then all difficulties of that kind would be avoided; and to my thinking have full as pleaſing an effect.

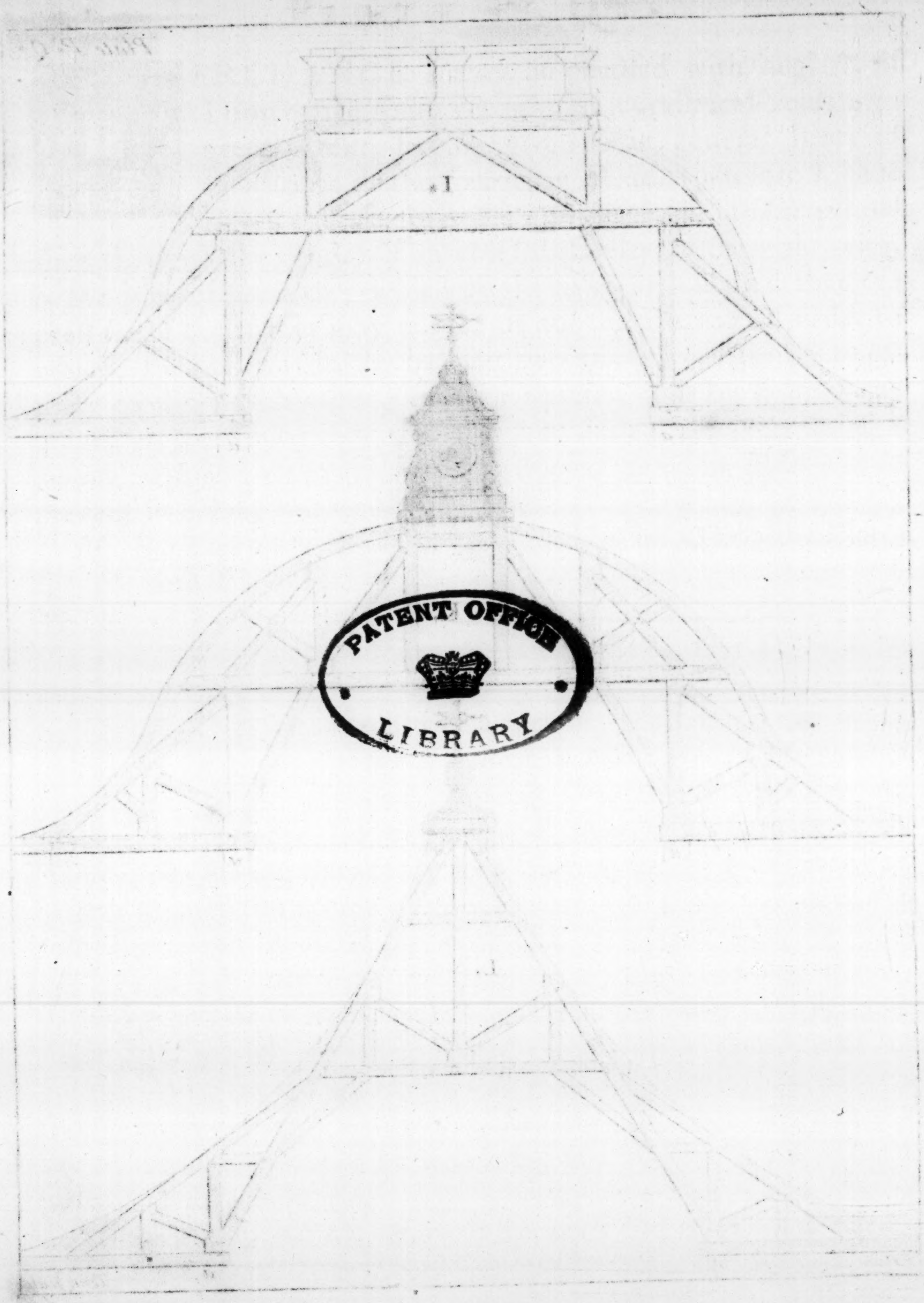
I think, by this time, enough has been ſaid of all roofs whatever, and hope to give no offence by ſo great a variety.

Plate P* Q*



F. Price inv. et delin

Toms Sculp



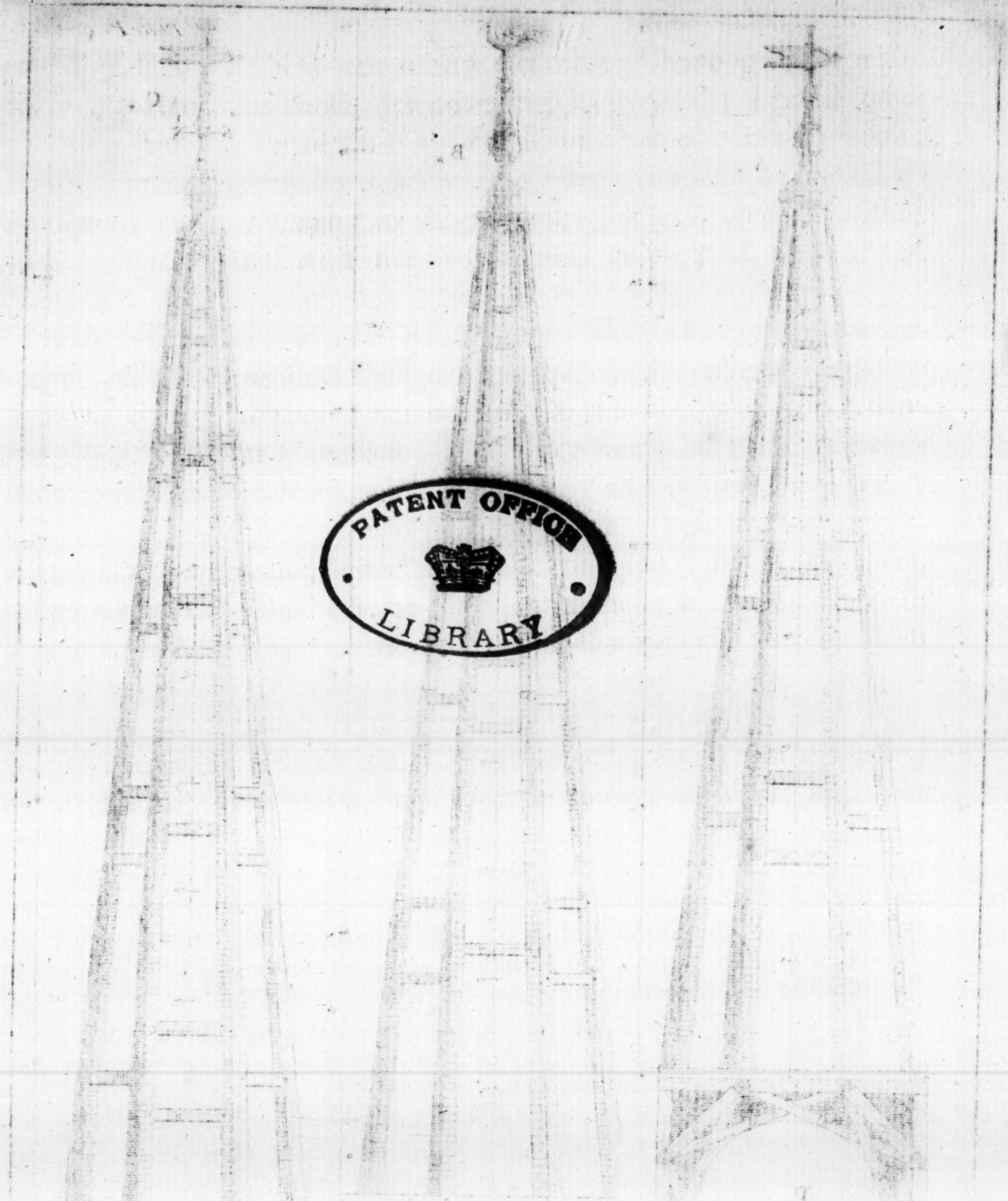
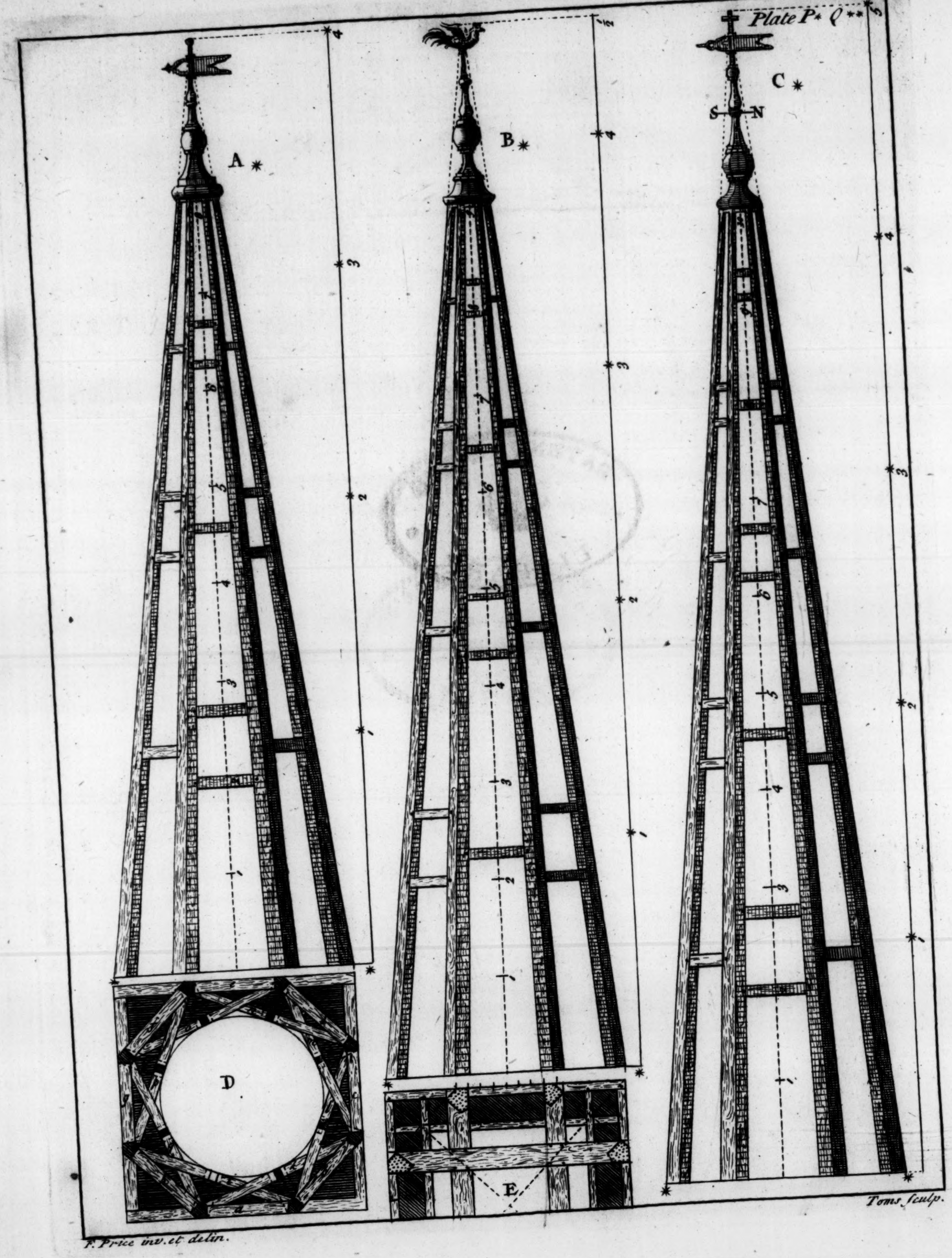

C
B
E

Plate P* Q**



F. Price inv. et delin.

Toms sculp.

PLATE P*, Q**.

PERUSING the many examples I have given for the truſſes of roofs, (or coverings in general,) I hope 'twill not be unpleaſing to ſay ſomewhat of timber ſpires; and as they have a pleaſing effect, I have preſumed to lay down rules whereby to ſhape them; which were founded on a ſerious peruſal of ſome of the moſt celebrated ones about *London*.

The firſt propoſition, as A*, is thus: Take the width, or diameter, of the intended baſe of the ſpire; the whole height is equal to four diameters; an octagon is the beſt plan for a timber ſpire, for many reaſons; and ſince none of them are executed without weather-cocks, or vanes, *(and which I am led to think was the cauſe of erecting them)* to find their proper height, with their ornaments, do thus; take one ſide of an octagon, that may be deſcribed on the plan; and make each ſide equal in height to eight times that breadth, as does appear in the draught, by the ſcale. The remaining is for the height of the vane, *or, weather-cock*, with its ornaments The length of the ſaid vane, is equal to two thirds of one ſide of the octagon at bottom, being divided into three parts, one for its point, *or dart*, and two for its tail.

N. B. What is ſaid of this, explains thoſe of B, and C, with a little due inſpection; theſe ſpires anſwer the three fineſt proportion'd columns, *viz.* that of A, has each ſide equal in height, to eight times the ſide of an octagon, that may be deſcribed on its plan. That of B, is equal in height to nine. And that of C, is equal to ten. Which appears by the draughts of each.

The timbers of the plan D, are thus connected together; firſt frame an octagon, with timber, as a, b, c, d, e, f, g, h; then halve two ſquares together, as i, k, l, m, n, o, p, q; and frame them into the ſaid octagon. Laſtly, (cock or) dovetail down the beams, r, s, t, u, w, x, y, z, on which your hips or corner poſts ſtand, and are framed into. So that by bolting theſe frames together, and working up betwixt them, with ſuch materials as the tower it ſtands on is built with, it takes off the objection, that may be made, concerning its rocking, ſhaking, or heaving, as it may be term'd.

Note, As to the framing of the ſides, it admits of no great variety; each ſide becoming a truſs, by its being a triangle; the other parts that occur, have been explain'd in the foregoing Plates.

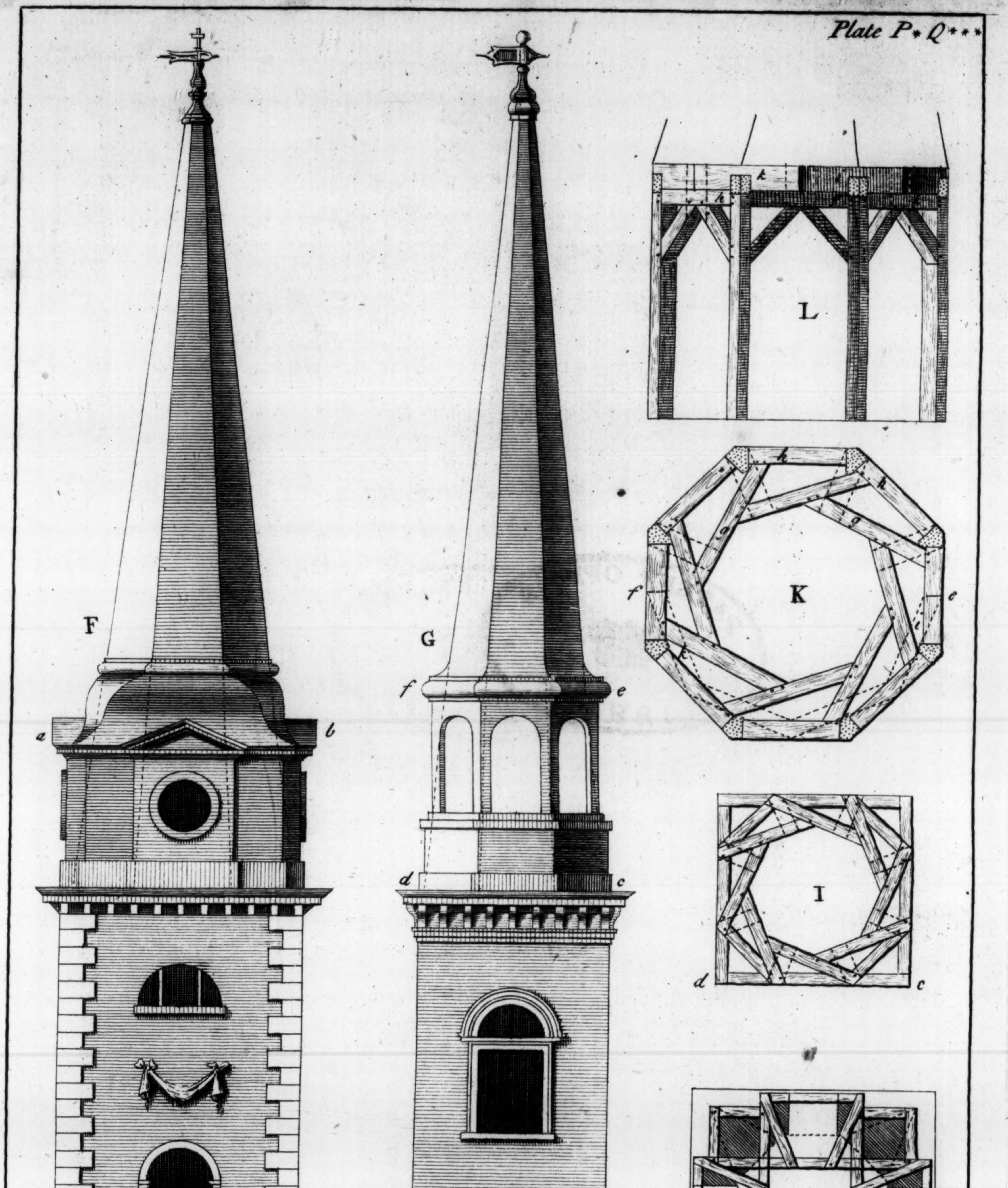
PLATE P*, Q***.

PERCHANCE quotations from other books, or remarks on fabricks already erected, might have given ſatisfaction to ſome of my readers; however, as this ſubject has been drawn from experience, I hope it will be acceptable, and more to the purpoſe, than ſuch a production would have been; and as ſpires are a material part of carpentry, I am therefore induced to deſcribe ſomewhat more variety of them, (as to the tower that a ſpire ſtands on, I cannot conceive it to be any other, than a kind of pedeſtal,) therefore the particulars of the total form, I ſhall leave to inſpection.

Lanthorns, or large openings, render a ſpire weak, unleſs care be taken in the performance; therefore I chooſe to explain that particular, as uſual. The plan H, embraces the upper part of the tower F, as at a, b; not but on occaſion the upright part, whereon generally the dial is placed, may be of timber. (And therefore capable of any form, if done with brackets, which may be fix'd on the principal timbers); the ogee roof, by its ſpreading helps to embrace and ſtrengthen the whole the better. The plan I, embraces the upper part of the tower G, as at c, d; and as I ſaid before, all openings require care, more particularly a lanthorn; therefore I have drawn the parts at large; K being the plan on top of the lanthorn, as at e, f; and as ſo much was ſaid of the connection of the timbers, *&c.* in the foregoing Plate, it needs not be repeated here; that of L, is the lanthorn enlarged, and in which is ſhewn, how the diagonal pieces, on which the hips ſtand, are embraced by the frame g, h, *&c.* being underneath the ſaid diagonal pieces, and the pieces i, k, *&c.* lying on the ſaid diagonal pieces, which being bolted or ſcrew'd together, prevent the weight of the materials, or the force of the wind, from ſeparating them.

I make no doubt but due inſpection will explain the particulars; and thus, I think to have compleatly furniſhed the ſtudents in architecture, with many examples of the moſt firm methods, of connecting of timbers together, in all the variety of caſes that may probably happen.

Plate P Q****



F. Price inv. et del.

Toms sculp.

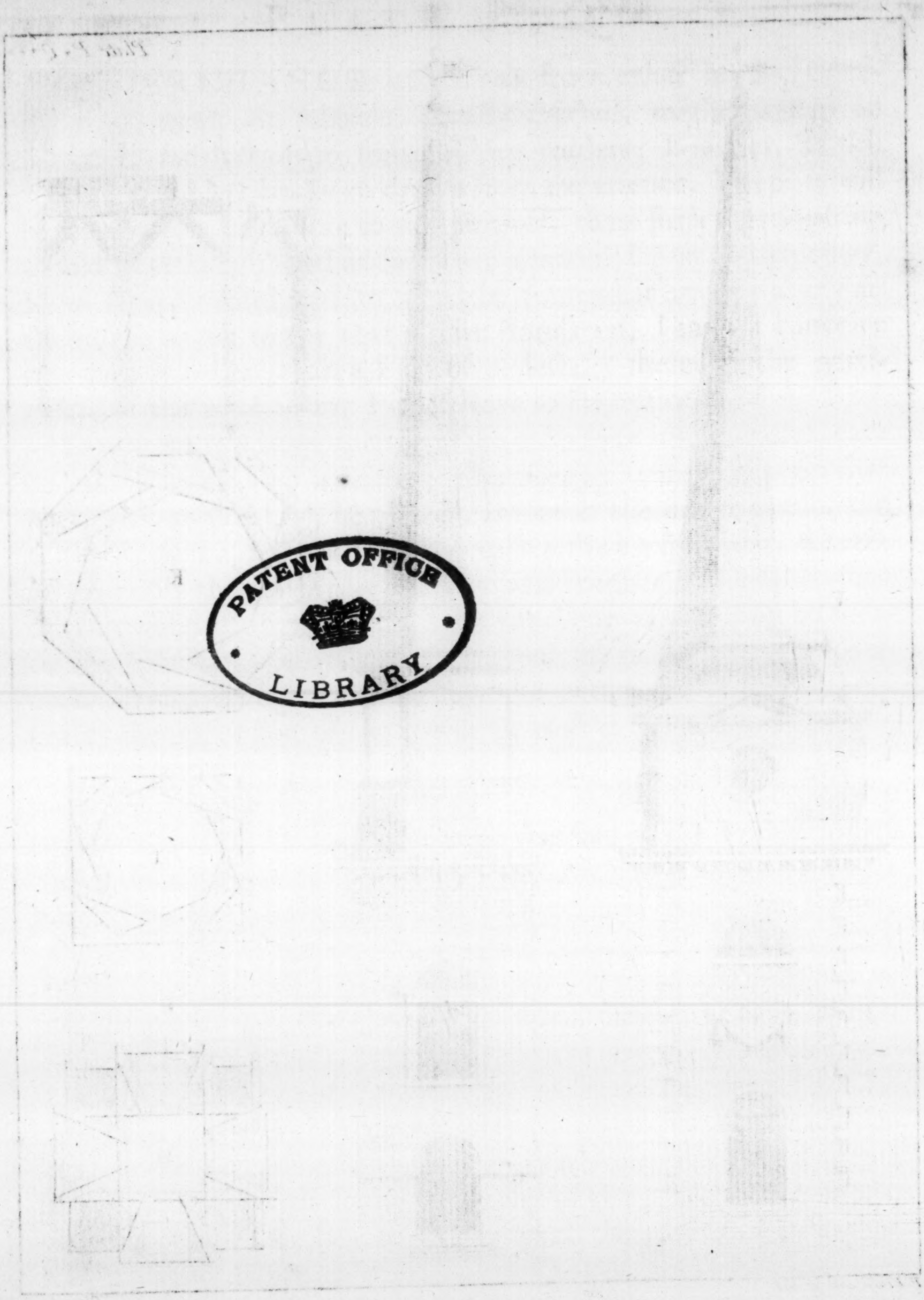


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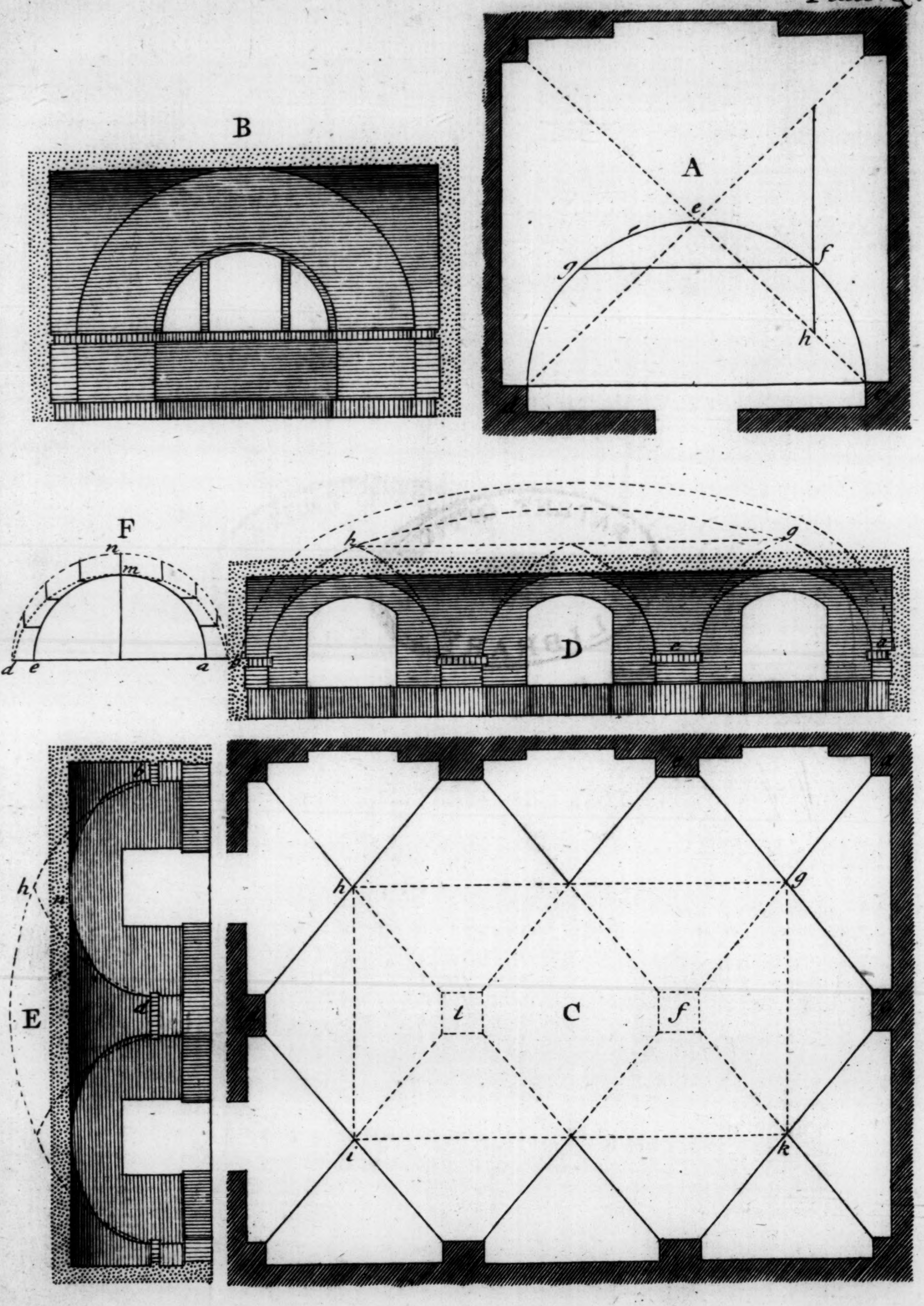
Plate Q.



F. Price inv. et delin.

Toms ſculp.

PLATE Q.

QUITE ſatisfied with what has been treated of, as to the roof or cover; I think it proper to ſhew the nature of centering vaults.

Let A, be a plan of a vault to be centered for groins. At a, b, c, d, are piers, generally prepared in and with the foundation, which bear the weight of the brick-work. Firſt reſolve on the curve you would have; as d, e, c, being a ſemi-circle, which is ſhewn by the ſection B. Begin in A, at d, e, c; center it through, as if it were a common-vault, and board it; which being done, to make your groin ſet centers, as from a, to c, and from b, to d; divide the curve d, e, c, into four equal parts, as at g, and f; ſo is g, e, f, ſmall centers you will want to nail on the centers firſt boarded, whoſe place or plan is at h; theſe ſmall centers may be put in at pleaſure, according to the bearing of your boards, that is, as to the diſtance between each center. To make your groin ſtreight on its baſe, at ſome little height over the centers, ſtrain a line from b, to c, or d, to a; from which drop perpendiculars on your boarding, firſt fix'd at as many places as you pleaſe, there drive in nails, and bend a ſtreight rod 'till it touch them all; and then with a pencil, or chalk, deſcribe the curve ſo form'd, to which bring the boards to be nailed on theſe little centers, and their joints will form a ſtreight groin. If this ſhould be diſapproved, in the next PLATE is a more accurate method.

Let C, be a plan of greater extent, and which ſuppoſe to be ſupported by two piers, as f, l. The ſection D, is compoſed of entire ſemi-circles; then conſequently your curves in the ſection E, will be elliptical, as b, m, d, and may be deſcribed with a trammel, or traced (by PROPOSITION K) as in F, may appear. What was ſaid of A, explains this at one view.

If theſe pillars ſhould be in the way, view the plan and ſections again. Firſt, form ſome principal curve, as in D, at a, g, h, b; being an ellipſis, ſo that the centers will be a Gothick ſweep; againſt the windows, as e, g, a, trace the curve d, h, b, in E, agreeable to e, g, a, in D, with which center it, as ſhewn in A, and make good your groins to the ſides: Laſtly, make a flat center, as at g, h, i, k, which flatneſs is ſhewn in either of the profiles or ſections D, or E, and fix it on your centers before compleated, which, doubtleſs, due inſpection will make plain; and hereby you avoid the pillars, and are equally as firm.

N. B. The cauſe of thoſe centers againſt the windows being a kind of Gothick arch, proceeds from their making part of the whole ſweep, or arch, which though it does not add to its beauty, it does to its ſtrength in a particular manner.

PLATE R.

REGARDING variety, I have given here another method for vaults, and which indeed may give more pleaſure to the reader, as being a curioſity never before publiſh'd, and may appear more intelligible than that in the foregoing PLATE.

View the plan G, and its ſection H, which is compoſed of entire ſemi-circles, as b, f, e. See alſo the ſection I, which is an ellipſis traced from b, f, e, in H: But for uſe, nothing is more true than the trammel, as ſhewn in PROPOSITIONS L, M. This, I ſuppoſe, is ſo plain as to need no explanation, otherways than what was ſaid in the foregoing PLATE, as on *Fig.* A.

See this plan again, and alſo its ſection I, from which is deſcrib'd the curvilineal face K, and alſo the face of the ſemi-circular arches, as L; all being alike. And this is what I call a more accurate method for finding the groin, ſo as to be ſtreight over its baſe, and at the ſame time gives a ſtandard rule, whereby to account for any curve, or face of a cieling whatever. The curve in I, is divided regularly, tho' ſeemingly into unequal parts, which being drawn to the groin in the plan G; as appears by the figures 1, 2, 3, 4, 5, 6, 7, 8, 9; and which are transferr'd into L, at 1, 2, 3, *&c.* Alſo the circle b, f, e, in H, is divided into eighteen equal parts; the half, conſequently, into 9; which appears from b, to e, in L. This method doubtleſs will be plain, and therefore needs no farther explanation.

That of K, belongs to the ſection I, extended as it were; and that of L, belongs to one of the ſmall arches of H, alſo ſtretch'd out, they being all alike.

N. B. To find the groin by a more common method, do thus: Erect a ſtreight piece of a board, or the like, on the corner of the pier the groin ſprings from; and drive a nail in the point of the groin's meeting, on which faſten one end of a chalk-line, ſtraining it tight, ſlide it down the ſide of the ſaid ſtreight piece, and it will form the groin, ſo as to ſtand perpendicularly over its baſe.

Plate R.

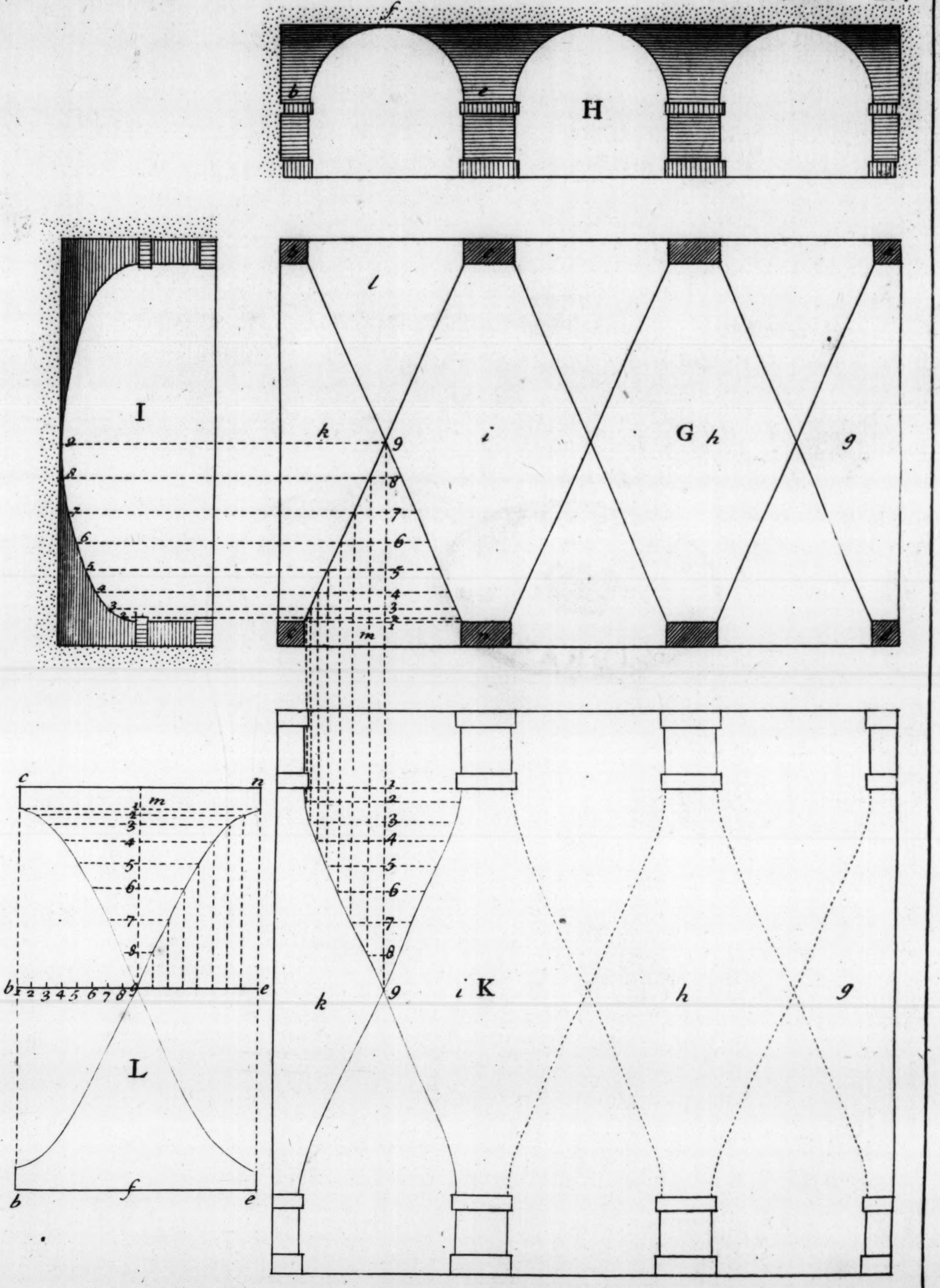


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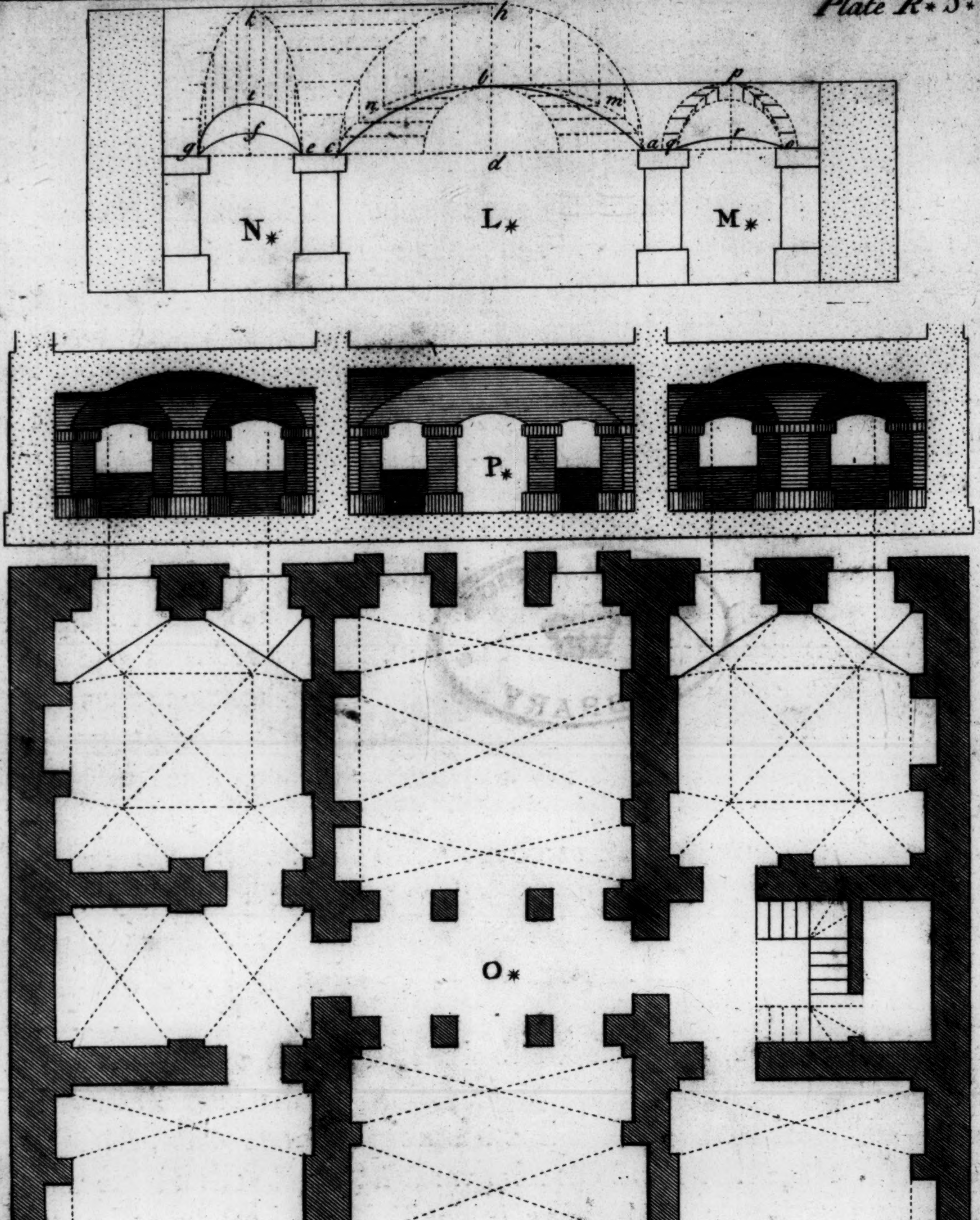
Plate R* S*



F. Price inv. et delin

Toms sculp

PLATE R*, S*.

REVIEWING ſeriouſly ſome remarks, which I had made, concerning the force of arches; they ſeem'd worthy of obſervation, and will, I hope, be acceptable to the publick.

Admit the opening L*, to be a ſegment, or part of a circle of a great extent, as a, b, c; and neceſſity ſhould require the ſmall opening M*, or N*, to be joined thereto, and arched over for a particular uſe; ſuch as a bridge, or portal, *&c.* the proper ſweep, or curve for them, (according to the laws of ſtrength,) will be thus: Take the height of the large one, as d, b; obſerve how many times it may be contained in the baſe a, c, as here four times and an half; therefore divide the opening e, g, in N*, into nine parts, two of which is the due height; as e, f, g; *(it may be done by the arithmetical rule of proportion.)* This ſmall arch will be more capable of reſiſting the force of the great one, if it be part of the ſame curve, as in M*, at o, r, q.

Obſerve the ſame figure again; and admit the opening L*, to be a ſemi-circle, as a, h, c; then the ſide arch as N*, may be a ſemi-circle alſo, as e, i, g; obſerving to place it on the ſame baſe or level.

There is abundance of difference between what is above obſerved, and centering for brick-work, or ribbing for plaiſtering; for in brick-work eſpecially, the groin's embracing ſeveral parts of the plan, gives it ſtrength; and its riſing to an equal height, gives it a beauty; a ſpecimen of which, we may ſee in the aforeſaid figure, *viz.* admit the opening L*, to be a ſemi-circle, as a, h, c; and the leſſer opening N*, to be an ellipſis, agreeing with it, as e, k, g; or again, admit the large opening L*, to be an ellipſis, as a, m, b, n, c; and the leſſer opening M*, to be an ellipſis, agreeing with it, as o, p, q; theſe will neceſſarily prove both aſſertions.

I have deſcrib'd the cellar plan of a dwelling-houſe, as O, to ſhew the variety of groins, that may be required; which I have done with intent to make the knowledge thereof more plain.

The plan of each groin, is repreſented by prick'd lines, whoſe ſection is P*; the reſt ſeems plain by inſpection.

PLATE S.

SUPPOSE M, to be the plan of a cieling, as a, b, c, d; and in it, it is required to have a large frame, gulochi, or pannel, as g, h, i, k.

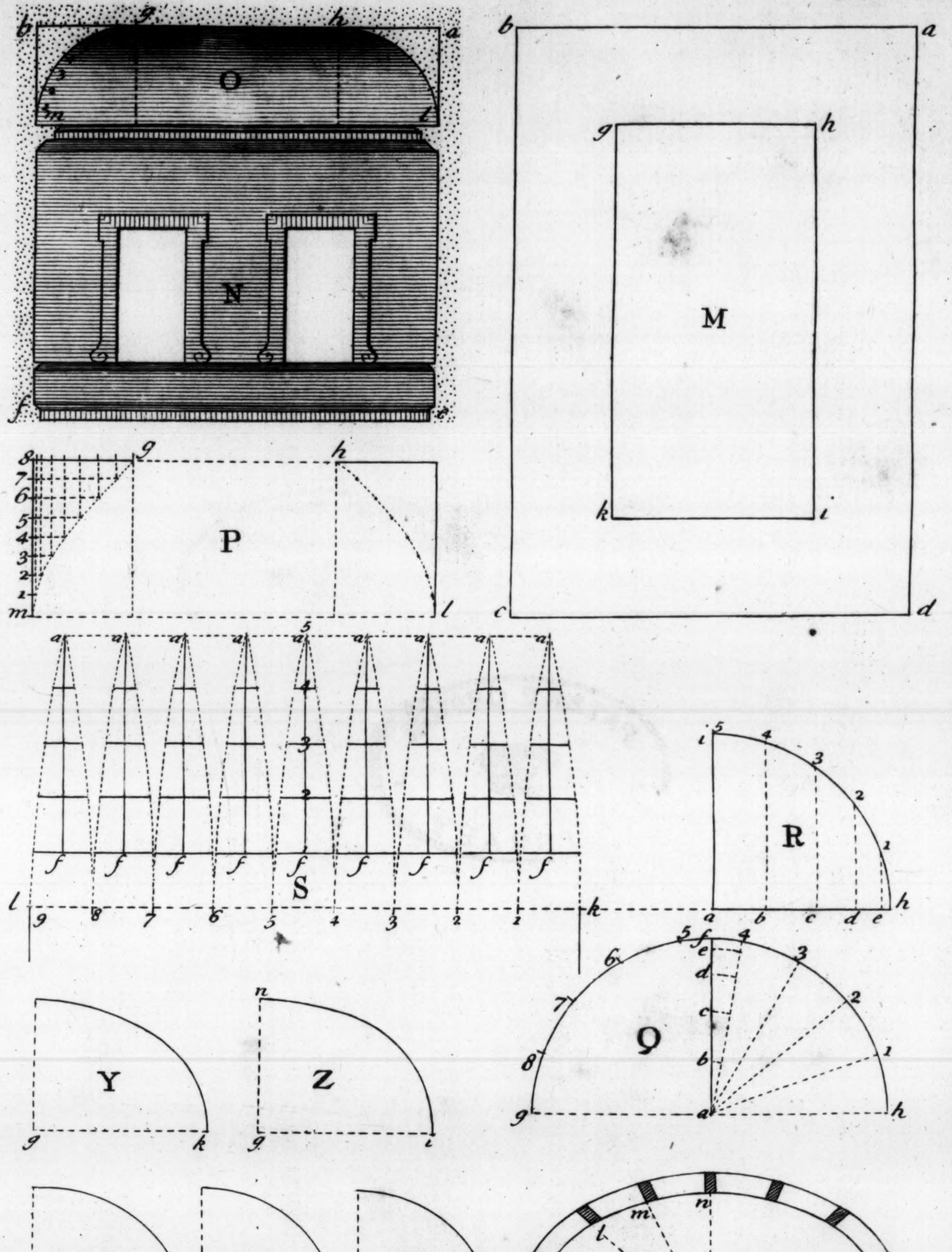
Firſt, produce ſome one ſide or end of the room, as N. Let it be required to deſcribe the curvilineal face of the cove. The extent of the end of the ſaid room, is a, b, f, e; and it is coved one fourth of its height, as m, b. The ſaid frame or pannel being g, h; the quarter-circle m, g, is divided into eight equal parts, which are transferred to P; ſo that m, g, h, l, is the face of O, as ſtretch'd, or extended out, on which any thing propoſed to be deſcrib'd therein, may be truly perform'd.

In Q, is ſhewn the plan of a nich, or dome. If a nich, let it be demanded to be fineered with walnut-tree, &c. If a dome, let it be required to be cover'd with boards or lead. Divide it into any number of parts, as here into nine; which transfer to S, as appears from k, to l. Deſcribe the ſection alſo, as R, being a quarter-circle, which divide into any number of parts, as here into five, as is ſhewn in the figure from h, to i; which transfer in the plan Q, from a, to f; middle ſome one diviſion, as from 4, to 5; then take thoſe diſtances from R, and transfer them to S, as from f, to 5; ſo that each diviſion is halved, or middled, as f, a; f, a; &c. on theſe lines place the diſtances from Q, as at e, d, c, b, to 1, 2, 3, 4, in S; and theſe will form ſuch curves as ſhall meet.

N. B. The more parts it is divided into, the better and truer it will be perform'd.

In T, is ſhewn the plan of an elliptical nich; its ſection is the ſame. In the plan T, is ſhewn the thickneſs of the ribs (ſuppoſing it to be prepared for plaiſtering) as i, k, l, m, n. The manner of forming their ſeveral curves, as U, W, X, Y, Z, is beſt done with a TRAMMEL. Some of theſe ribs muſt be ſloping, ſo as to require the mould to be ſhifted, as has been before ſhewn, in PLATE P.

Plate S.

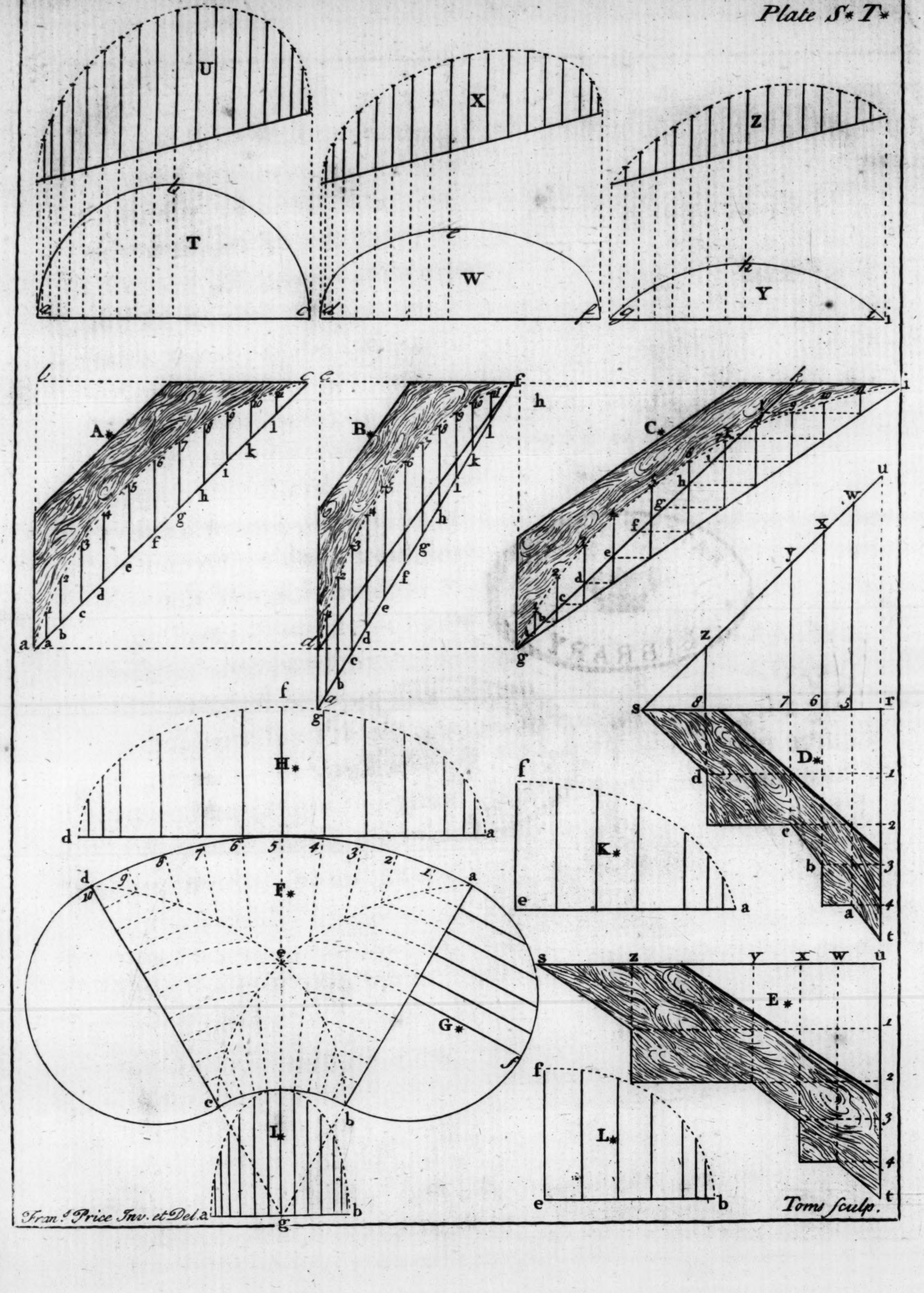


F. Price inv. et delin.

Toms sculp.

2

Plate S* T*



Fran.s Price Inv. et Del.

Toms sculp.

SUCH things, as the conſtruction and uſe of lines, are not conceiv'd by every one; therefore becauſe I would omit nothing that, I think, would prove uſeful, I have inſerted ſeveral more examples of tracery, the knowledge of which ſeems indiſpenſably neceſſary.

That of T, is a regular ſemi-circle, as a, b, c; from which is traced the raking (or rampant) one U; that of W, is a regular ellipſis, as d, e, f; from which is traced the raking one X; that of Y, is a regular Segment (or part of a circle,) as g, h, i; from which is traced the raking one Z; the manner whereof being ſo plain, a farther explanation ſeems needleſs.

As to the particular uſe of theſe kind of arches, I muſt leave to the determination of the curious, and have nothing farther to ſay on that head, than that if occaſion require either of them to be executed, there is no other true way to deſcribe them.

That of A*, is ſuppoſed to be the mitre bracket of a cove, whoſe projection is b, c; and the height thereof is a, b; the curve being a ſegment, or part of a circle, let it be demanded to trace a curve from it, as B*, which ſhall be agreeable thereto, if applied as a common bracket, e, d, being its height, as before, and e, f, its projection, firſt, divide the given curve, being A*, into a number of parts, or if you make points thereon promiſcuouſly, 'tis equal. From theſe diviſions, or points, drop perpendiculars to ſome ſtreight line, as that of a, c, obſerving their meeting with the ſaid line a, c; and for practice, take off all theſe diſtances on a lath, (or rod), applying the proper end thereof to the projection of the common bracket B*, being f; obſerving where the other end paſſes through the perpendicular line e, d, as at g; there raiſe perpendiculars (long enough) from the ſaid points, then draw the line d, f. Laſtly, transfer the diſtances, as from the ſtreight line a, c, in A*, to the figures, to that of d, ſf, in B*; which, no doubt, inſpection will explain, more eſpecially if the letters and figures be duly obſerved.

And for variety, view the figure A*, again; and admit it were the curve of a common bracket, let it be demanded to trace a mitre, or angle bracket from it, as C*; g, h, being its height as before, and h, i, its projection, (as to the method of finding the projecture of either, no doubt but every one knows it) take the line, as a, c, in A*, which in practice (as was before obſerved,) I ſuppoſe to be on a rod or lath, with its diviſions, or points on it; and which transfer to C*, as g, k; then draw the line g, i; laſtly, from the ſaid points on the line g, k, draw baſe lines, obſerving their meeting the line g, i; at which reſpective places raiſe perpendiculars, and transfer your ſeveral heights from A*, as before, obſerving to place each in its due poſition. And although the abundance of points ſhould render this method ſomewhat confuſed, it may be evaded by making but few points, and driving nails therein, round which a ſtreight lath being bent till it touch them all, the curve may be deſcribed with a pencil, *&c.*

N. B. This may ſerve as a general rule, for all ſuch curves as are not regular, or cannot be formed with a trammel, ſuppoſing either to be the given curve.

That of D*, repreſents a common bracket for a plaiſter'd cornice, *whoſe ſhape, the* Plaiſterer *ought always to be conſulted for*, let it be required to trace a corner, or angle bracket from it, as E*; firſt, draw baſe lines from the reſpective angles, a, b, c, d, to the line t, r, as 1, 2, 3, 4; and alſo perpendiculars to the line r, s, as 5, 6, 7, 8; and (becauſe an example for finding the projecture of the angle or mitre bracket, may be required) obſerve to make r, u, equal to r, s; ſo is u, s, the projecture of the ſaid angle or mitre bracket; and the points will be w, x, y, z; ſo that by transferring this ſaid line with its points, as before, to E*, as alſo thoſe of the height, as before, draw perpendicular and baſe lines; as no doubt inſpection ſhews. Their meeting gives the ſhape of the bracket as deſired, and this alſo may ſerve as a ſtandard rule, in any ſuch caſe. As to ſhifting this mould (in practice) ſo as to give the ſaid angle bracket its true back, there ſeems to have been enough ſaid in Plate P.

Note, The principal curve being formed on any plain ſurperficies, it may be taken off on a lath, as before was obſerved; and by it the required curve may be deſcribed on a piece of ſlit-deal, *&c.* of a width equal to what the arch riſes from a ſtreight line, with allowance of wood capable of holding it together.

PLATE S*, T*.

That of F*, is a plan, or ſpecimen of circular groins, whoſe extent is a, b, c, d; an example of which may be ſeen in St. *Clements Danes*, in the *Strand*, and in ſeveral other circular buildings, and in my opinion it is a curioſity worthy of regard. To find the plan of theſe groins do thus: Divide from a, to d; and from a, to b; into a like number of parts, as into ten; the lines a, b, and d, c, being continued, meet in a point as g; being the center of the curves, a, d, and b, c, divide alſo from a, to d, into ten parts; which being drawn to the center g, divides the line b, c, into the ſame number of parts equally, ſo that the meeting of theſe lines, is the plan of the groins, as a, e, c, and b, e, d; and their upright is H*, I*, K*, L*, each being traced from the ſemi-circle, a, b, f, in G*, (being the principal curve;) as to the method whereby it is done, enough ſeems to have been ſaid of the foregoing examples to explain it; the letters of reference ſhew plainly what part of the plan each curve belongs to, which being bent agreeable thereto, will ſtrictly correſpond with each other.

N. B. If the principal curve had been a ſegment, (or part of a circle,) or an ellipſis, the method of performing would have been the ſame.

This plan would be difficult in performance, if required to be ribbed with *Timber* for *Plaiſtering*; but if to be centered for *Brick-work*, it would be much eaſier; becauſe the centers might be placed as from the line a, b, to that of c, d; as in a common vault. The curves of each center would be different on account of its being taper, but the height is equal; theſe centers ſhould be boarded as others are, the boards requiring to be taper only.

To make the groins ſo as to hang over the plan, the ſides a, b, e, and c, d, e, muſt not be centered as uſual; but have ribs agreeable to the plan, and placed horizontally, ſo that the boards would ſtand as it were upright; as in domes, which was explained in the foregoing Plates, which ſhews the method for finding the curvilineal form of any cieling.

N. B, The foregoing PLATES muſt be well underſtood, in order to deſcribe on the centers firſt boarded, the accurate curve of the groin; which can be done by no other method, than is there ſhewn.

If this plan were to be executed with ribs of timber for plaiſtering, then the groins muſt be performed by the methods as will be hereafter inſerted, for the twiſted rails of ſtaircaſes, on account of their plan, not being a regular curve.

PLATE

PLATE T.

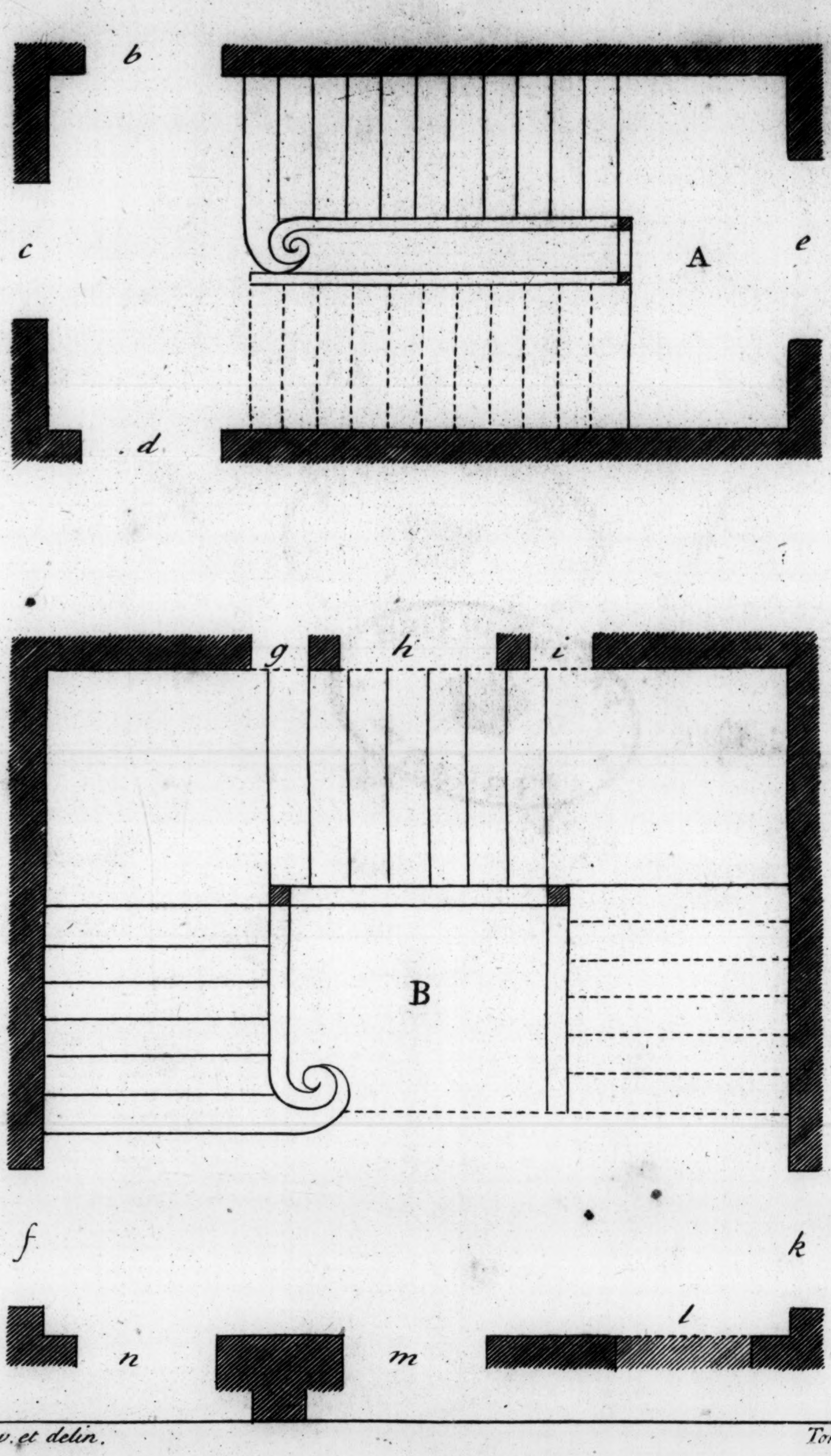
THINKING it may be agreeable to my reader, I have choſe to explain ſome principal matters in ſtairs, ſuch as their form, the kneeling, and ramp of their rails, with a new and exact method to ſquare a twiſted rail, either for ſtairs or other uſes; which point having never yet been fully clear'd, I hope it will be found uſeful.

Let A, be a plan, or opening for a ſtair-caſe; and b, c, d, be door-ways, and e, a window to light the ſame. The firſt thing to be conſidered, is the height of the whole ſtory, or floor; then form ſome plan for the landing the ſteps, and the half-pace; obſerving that the riſe of each ſtep be not leſs than five inches, nor more than ſeven: And that the tread, or breadth of the ſtep, be not leſs than nine inches, nor more than fourteen: Theſe are beſt done on a rod, dividing them exactly. This height or riſe, and the tread or breadth of each ſtep, is called a pitch-board; which ſhall be hereafter ſhewn, with its uſe: The length of each ſtep may be any thing above three feet, as the place will allow. (Theſe are called dog-leg'd-ſtairs.)

In B, is ſhewn an open newel ſtair-caſe; g, h, i, being a *Venetian* window to light the ſame, and k, l, m, n, f, door-ways leading to, or from the ſaid ſtairs. Theſe open newell'd ſtairs may be lighted from above, ſuppoſing there is not a conveniency for the window, g, h, i.

It may be obſerved, that ſtairs ought to be deſcribed, and accounted for juſtly, at the ſame time a plan of a building is made, for want of which ſometimes unpardonable errors have been committed; Such as having a little blind ſtair-caſe to a large houſe, or, on the other hand, to have a large ſpacious ſtair-caſe to a little one.

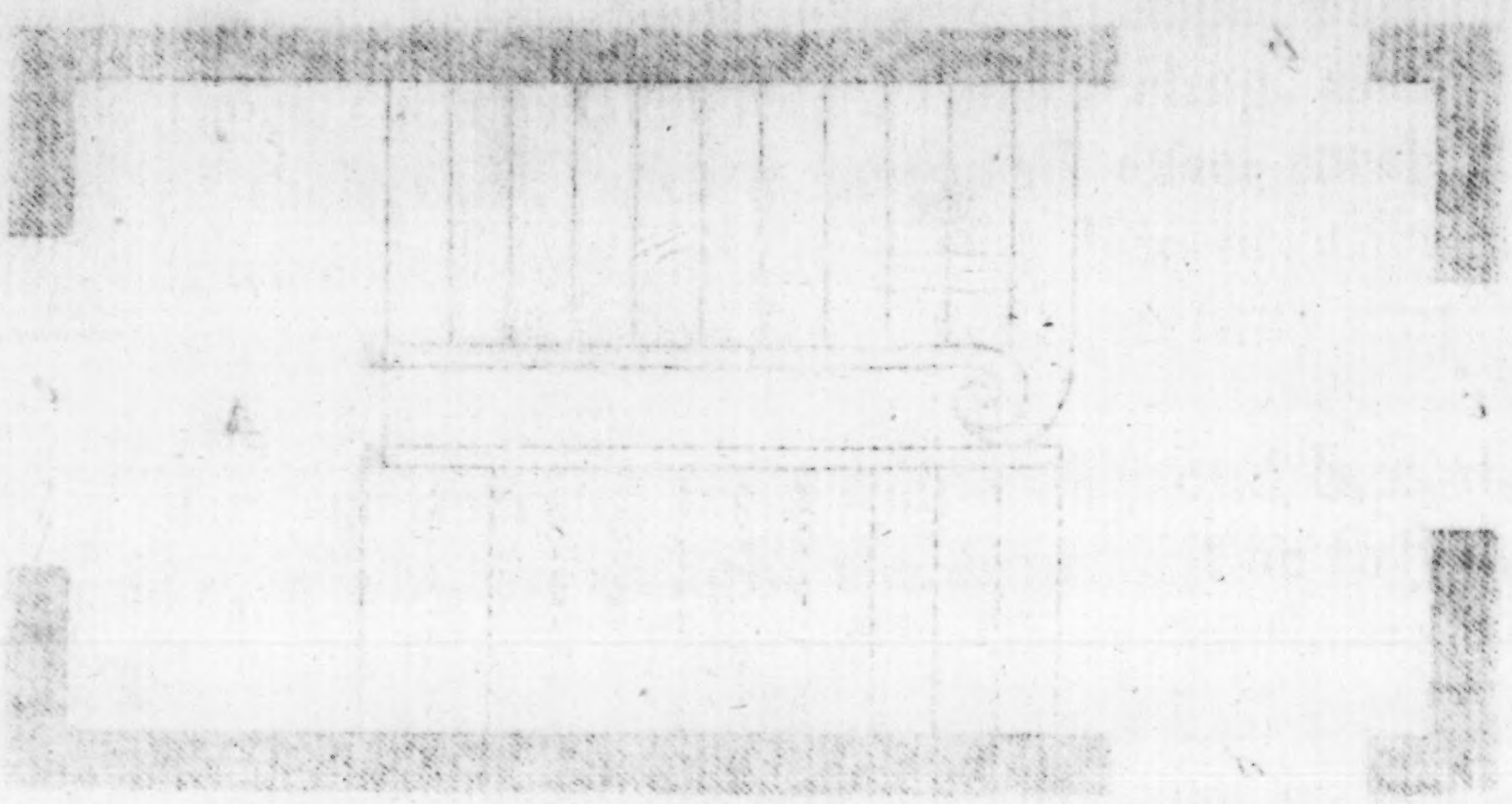
PALADIO ſays, *in placing of ſtair-caſes, the utmoſt care ought to be taken; it being a difficulty to find a place convenient for them, that will not at the ſame time prejudice the reſt of the building.*



F. Price inv. et delin.

Toms ſculp.

Plate 7.



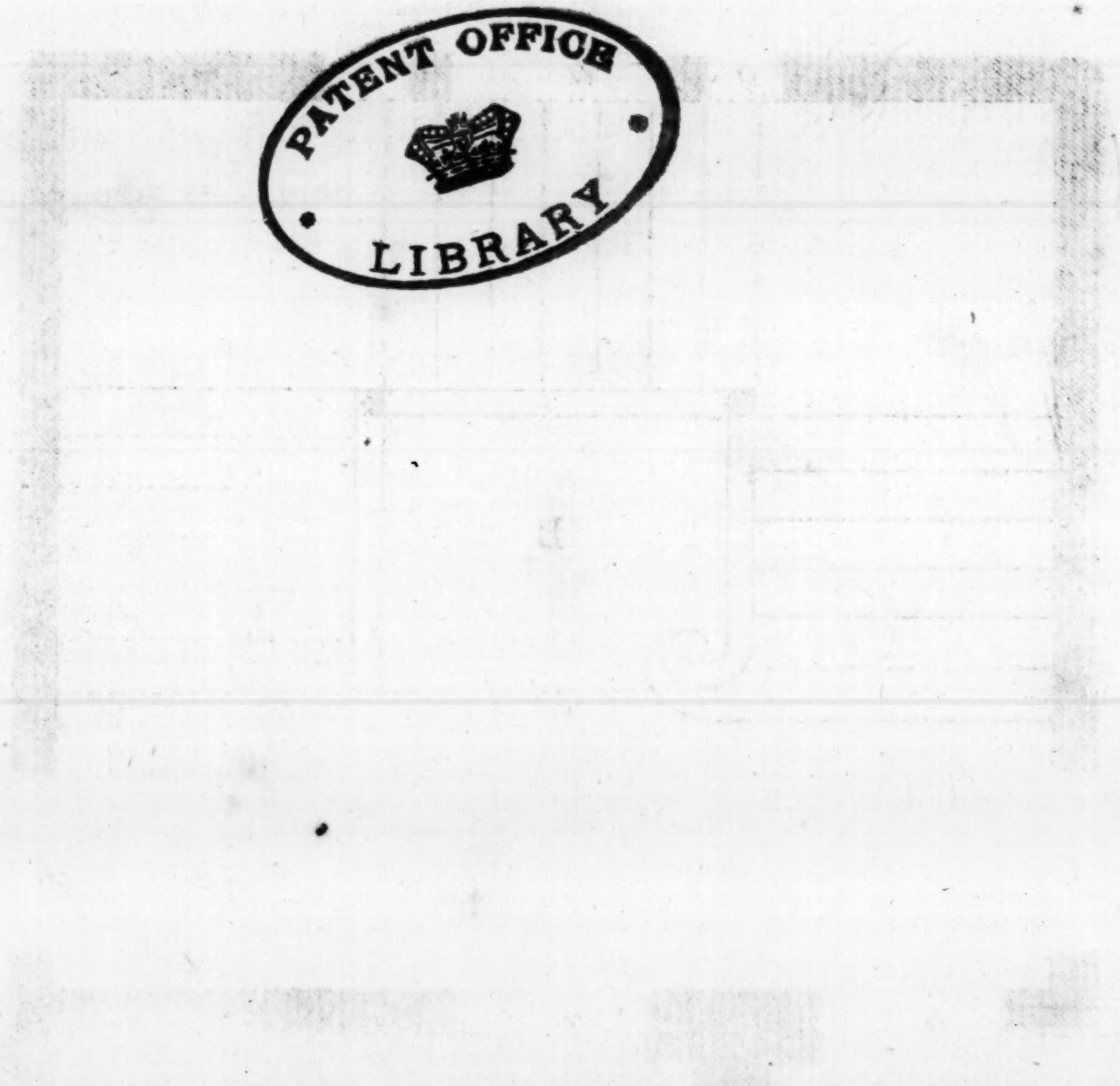
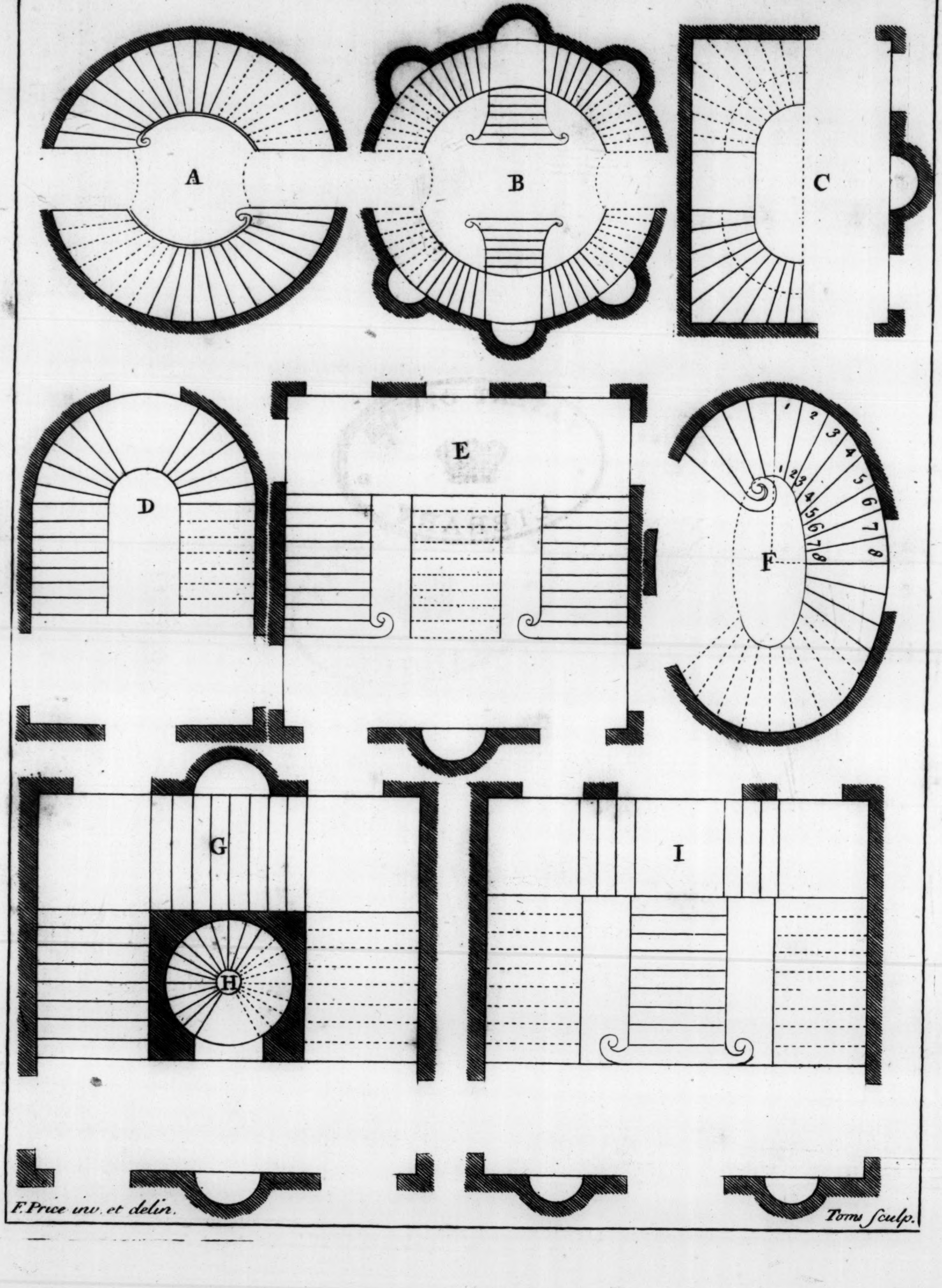


Plate T U**



F. Price inv. et delin. *Toms ſculp.*

PLATE T*, U*.

THAT practice has been my guide, may eaſily appear by this variety of plans of ſtairs, conformable to what was obſerved before.

Circular ſtairs are never uſed for beauty, but chiefly for conveniency of going up in a little room; they admit of being better lighted from above, in caſe they are placed in the middle of a building; and in their formation ſhould have this ſtrict obſervation, *viz.* to be equal in their tread, or breadth to the other ſteps, at the diſtance of two feet from the middle of the rail, or nearly ſo; the reaſon is, in going up, or down, your hand is generally on the rail, (which is made for that purpoſe,) ſo that betwixt both your feet, will generally be this diſtance of two foot, as was before obſerved, ſo that the ſtairs are thereby render'd eaſy; the feet feeling no difference, for what is contracted on one ſide, is ſeldom trod on, and very ſeldom on that part that is extended, unleſs two perſons go up or down together, or paſs each other.

This method is obſerved in the plans A, B, C, D, H; but is varied a little in the plan F, on account of its being oval, or elliptical; on which curves the ſteps are equally divided, on account of the rail, and ſtring-board, &c. as will be more plainly ſhewn in PLATE U, W, by ſections of each. Thoſe of A, and B, may be lighted from above. Thoſe of C, D, F, may be lighted by a ſide light, or as occaſion or convenience require.

Thoſe plans of E, G, I, are proper where midzanino's are made uſe of, eſpecially that of E, on account of its coming up half the height of the ſtory, at the half-pace; as to that of G, I cannot highly commend, but that indeed is not material, my meaning being to give variety only.

I beg leave to make one obſervation, concerning the placing of *Buſto*'s, or *Vaſes*, in niches by the ſides of ſtairs, *viz.* by having ſo many different views of them, in aſcending, and deſcending, no part of their beauty is loſt. I therefore conclude, they muſt neceſſarily prove very entertaining, and anſwer the end of their being ſo placed.

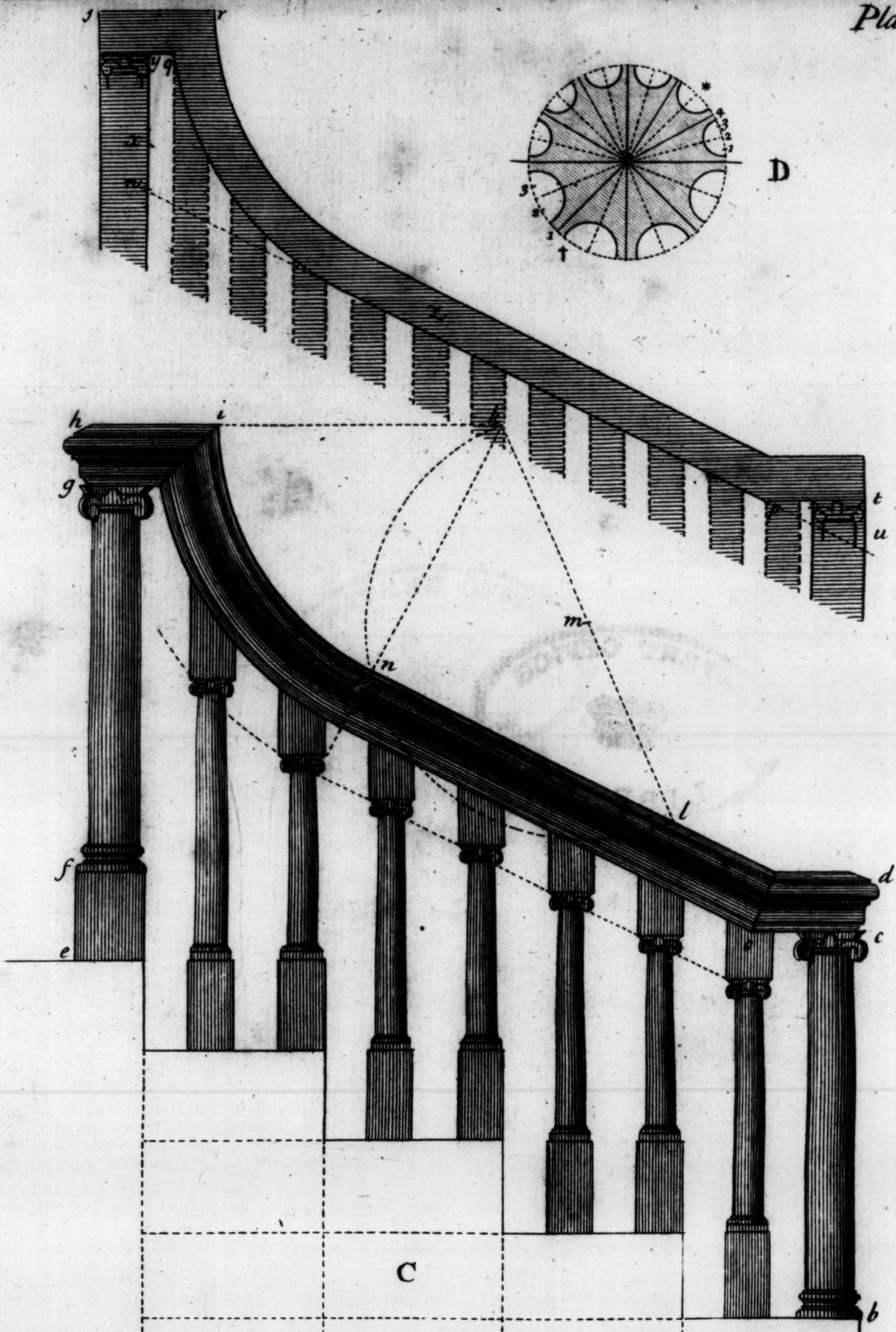
UNTO ſome, this method may be known though not practiſed. To find the proper kneeling and ramp of rails.

In C, is repreſented a ſhort flight of four ſteps, and part of a half-pace, on which are ſhewn two ballusters on a ſtep; a, b, is the riſe or height of one ſtep, and b, c, is the newel, generally two feet four inches and a half high, and ſometimes two feet ſix inches high, *&c.* and c, d, is the thickneſs of the rail, the kneeling o, is in the middle of the firſt balluſter; from e, to f, as alſo the height of the firſt ſtep on the half-pace; and f, g, the height of the newel, agreeable to that of b, c, and g, h, is the thickneſs of the rail; from h, to i, is generally the ſame as from o, to c, which line h, i, continue at pleaſure; for on it is the center for the ramp. With your compaſſes find the center k, which touches the back of the rail n, and the point of the ramp i; by PROPOSITION O, find the point of touch n; draw the line k, n; deſcribe the ramp, and alſo the turned part of the balluſters, as may be ſeen by the prick'd line.

Over this, is repreſented the alteration that ought to be made, if you place three balluſters on a ſtep; that is, that the kneeling ought to come to the back-ſide of the firſt and laſt balluſters, as at p, and q. If it be ſaid, the method in figure C, is not fully expreſs'd; to find the height of the ramp agreeable to the kneeling, let Z, be the rail, the bottom is continued as by the prick'd line appears at u, and w; take the diſtance u, t, and ſet from w, to x; from x, ſet one riſe, or the height one ſtep, as at y; and that gives the height of the ramp, and is the ſame as the method in figure C, notwithſtanding they differ in appearance.

In D, is ſhewn the manner of fluting newels for ſtairs, as *; and alſo balluſters, as †; the newel having twelve flutes, and the balluſters eight. If the ſtuff be large, the flutes may vary; thus the newels to have ſixteen flutes, the balluſters twelve; and in this caſe, PROPOSITIONS Q, and R, may be uſeful.

Plate V.



F. Price inv. et delin.

Toms sculpt.

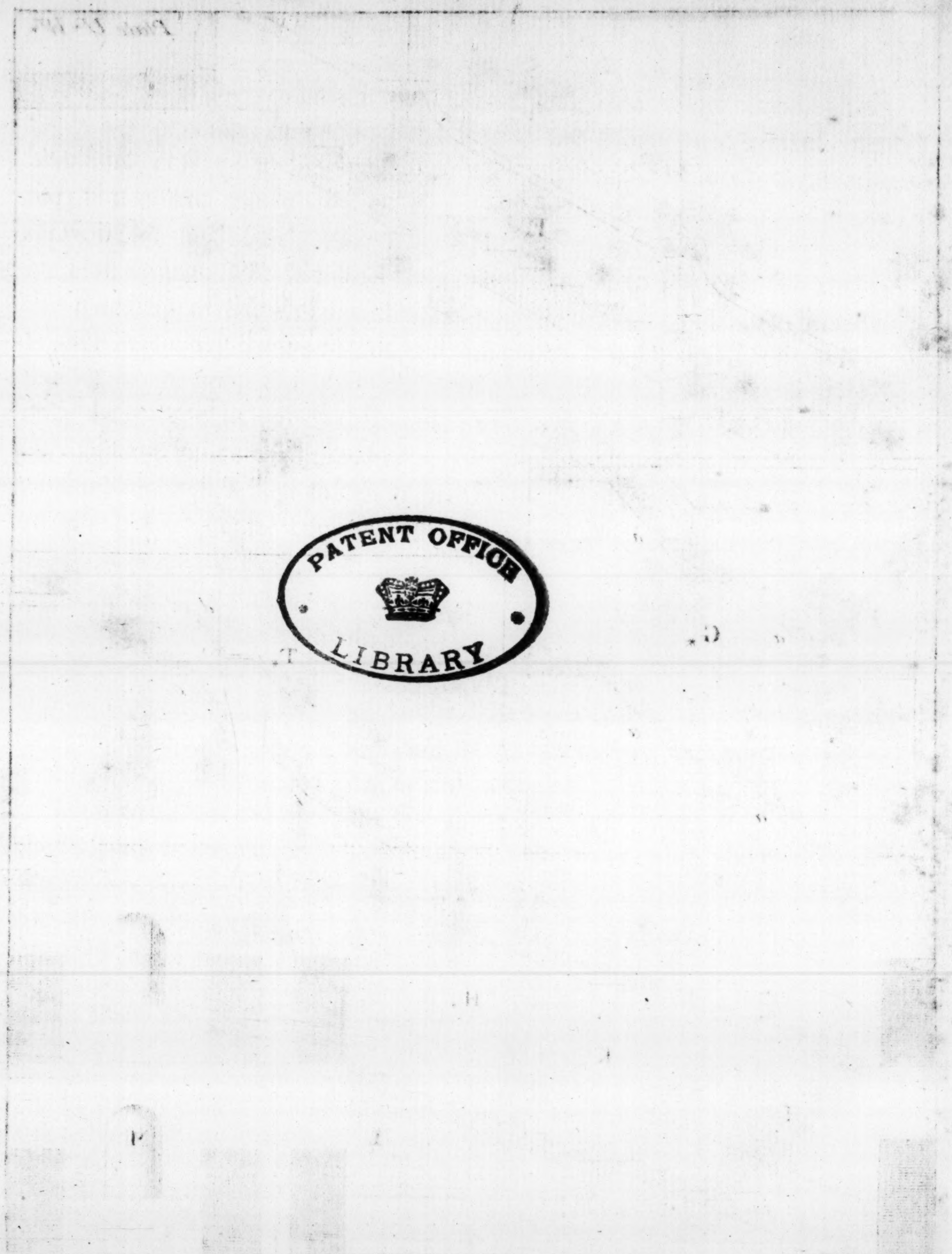
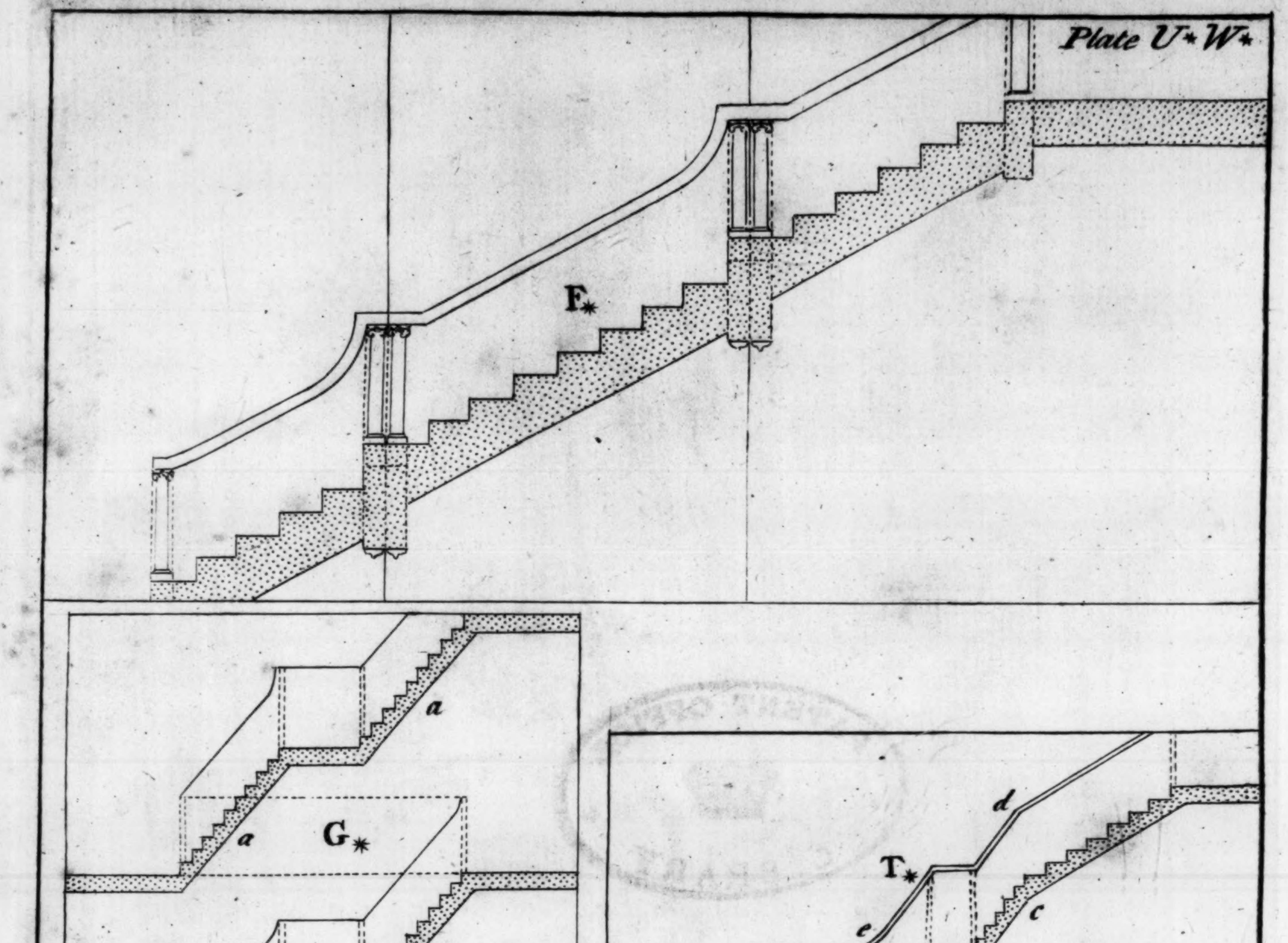

T
G
H
F
I

Plate U W**



F. Price inv. et delin.

Toms sculp.

PLATE U*, W*.

UNTO workmen that have not had experience, theſe profiles, or ſections of ſtairs, are more immediately neceſſary to be known, and deſcribed, before executed; for there are many difficulties which naturally occur, if theſe ſections be neglected, therefore I hope they'll not be uſeleſs.

The ſection F*, is taken from the plan B, in PLATE T, and is the meeting of the ſteps and riſers; with that of the ſtring-boards. Which not only ſhews the uſe of the pitch-board, in ſtriking out the ſtring-board, the newels, and rails; but at the ſame time, may be of uſe in other reſpects; 'till practice has made things of this nature more familiar.

The ſection T*, is taken from the plan D*, in PLATE T*, U*, and as before is the meeting of the ſteps and ſtring-board. In this figure, as at b, c, d, e, is ſhewn the ill appearance created by placing circular taper ſteps, among ſtreight, or parallel ones; the defect conſiſts in the ſudden turn, at the meeting of the ſaid mix'd ſteps, which cauſes a very ill appearance in the ſtring-board, and rail; notwithſtanding they may be humour'd a ſmall matter. There alſo appears a defect in its ſtrength, if executed with wood, though indeed if executed in ſtone, 'tis not ſo.

That of G*, is taken from the plan C*, in PLATE T*, U*, and as the plan conſiſts of two quarter-circles, on which the ſteps are equally divided, the ſection as at a, a, a, a, is a ſtreight line; which, when bent agreeable to the plan, becomes twiſted, and circular every way.

And as the form of the twiſted part of the rails, will be ſhewn in the following Plates; there ſeems no occaſion to take notice of them here, therefore in lieu, I will endeavour to ſhew a farther uſe theſe ſections may be of, *viz.* the ſection H*, is taken from the foregoing plan C*, in Plate T*, U*, and as I, K, L, M, repreſents the walls thereof, in which are the doors, and the profile of the ſteps, *&c.* by deſcribing two ſtories of any odd plan, in this manner, you not only diſcover whether you can accommodate your doors, windows, *&c.* but are always ſure to be ſatisfied concerning the head-way; which is a material point; all which, as I ſaid before, will be greatly aſſiſtant to ſuch as have not had experience.

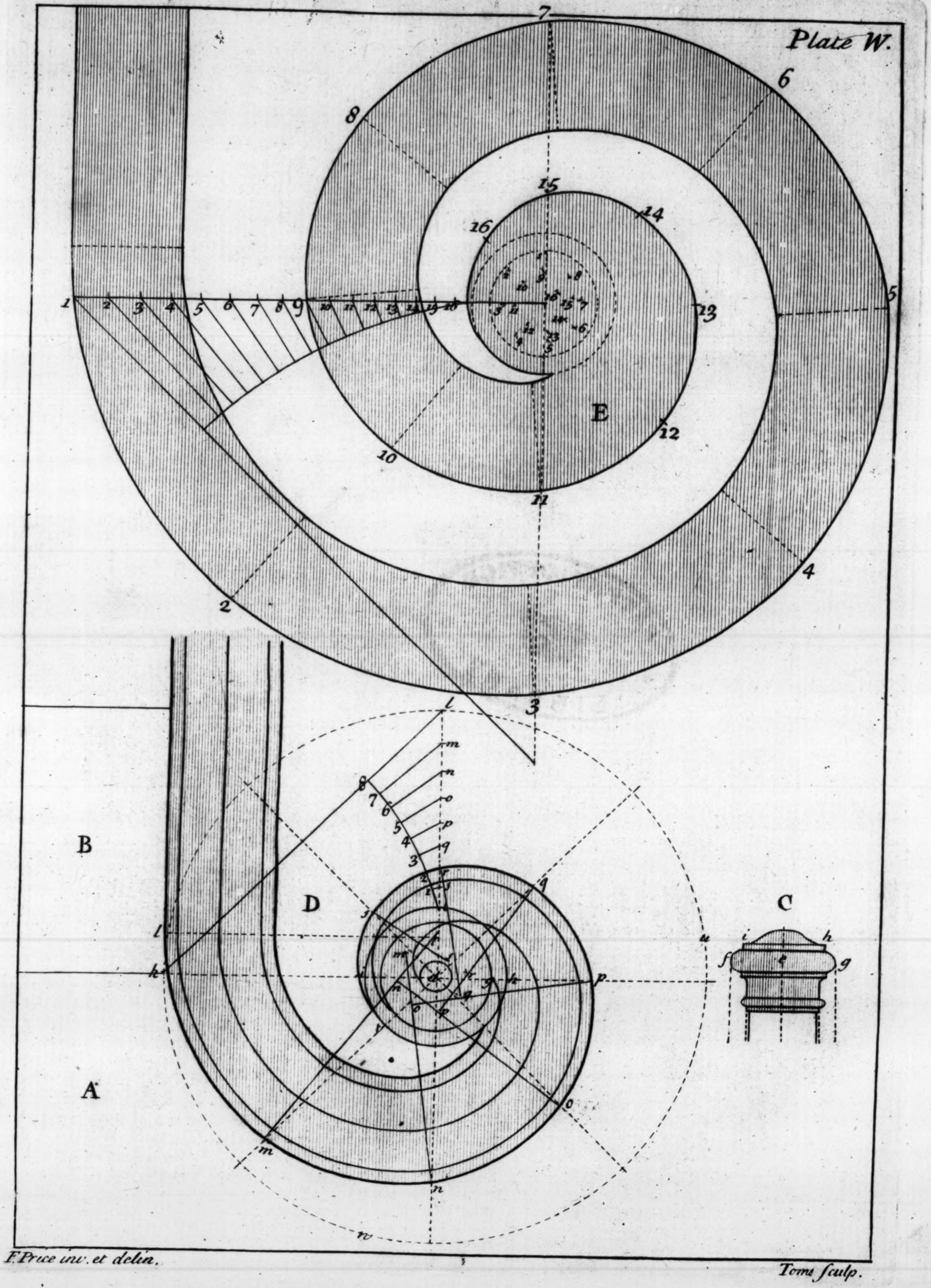
PLATE W.

WHATEVER may appear difficult in this method of forming ſcroles proper for the plans of twiſted rails, due application will make eaſy and expeditious.

Firſt, form a ſcrole with chalk, or a pencil, agreeable to the bigneſs of the place in which it is to ſtand; next reſolve on the bigneſs of your ſtuff to be uſed for your rails, and alſo your mouldings on the ſide thereof, as in C. Let d, be the center of your chalked ſcrole in D; on which deſcribe, with the projection of your mouldings from C, the ſmall circle d; take from C, half the bigneſs of the ſtuff, as e, g, or e, f, which add to the ſmall circle, and form the circle h, i, t; which is the bigneſs of the eye of the ſcrole: This done, take the diſtance from i, to the in-ſide of the rail, as the ſuppoſed chalked ſcrole, which ſuppoſe k; with it, make a diminiſhing ſcale, by ſetting that diſtance up, from t, to l; draw the line k, l; place one foot of your compſſes in k, deſcribe the part of a circle t, 8; which divide into eight equal parts, becauſe here your ſuppoſed chalk'd ſcrole was to come into its eye, or block, at one revolution of a circle. (Scroles may be made to any number of revolutions deſired, by the ſame rule) *Witneſs that above in Figure* E.

Place one foot of your compaſſes in d, deſcribe the large circle w, l, l, u; which always divide into eight parts, becauſe you ſtrike one eighth part of a circle every time, till you come into the eye, or block i, t, h; from the ſaid diviſions on the large circle, draw lines through, for on them your ſections meet, which form the ſcrole. It is obſervable in drawing your ſections, that they don't end in the line drawn through the great circle, only the out-ſide ſcrole; for thoſe of the in-ſide ſcrole end on a line drawn to each reſpective center. I ſuppoſe A, and B, to be two ſteps; the reſt I think cannot fail of being underſtood, by obſerving the letters and figures, which ſhew each part diſtinctly.

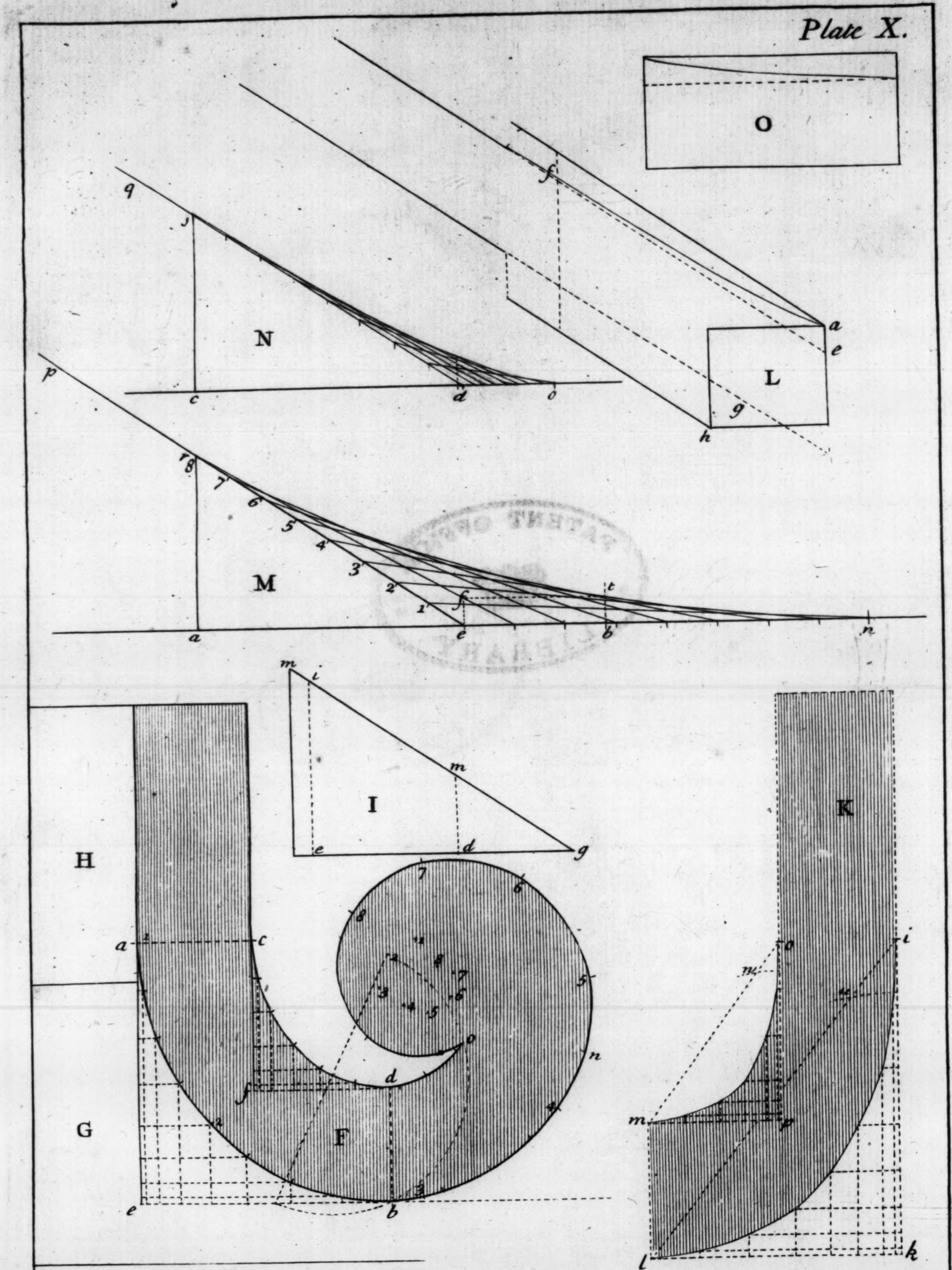
Plate W.



F Price inv. et delin.

Toms sculp.

Plate X.



F. Price inv. et delin.

Tome sculp

PLATE X.

X———IN order to make the ſquaring of a twiſted-rail eaſy, ſee the plan F, which is the ſame as that in the foregoing PLATE W, and by PROPOSITION O, find the point of touch b. From theſe curves a mould muſt be traced out, in order to form a ſweep, which when applied on the rake, is agreeable to this of a, b, c, d, as that of K. (It is firſt to be obſerved that you will want wood extraordinary, both on the top of the rail, as in L, at e, a; and alſo under the ſame, as g, h.) To find which obſerve where your ſweep begins, in the plan F, as at a, c; alſo obſerve that o, and n, is the end of the twiſted part. Therefore from a, to n, divide into a number of equal parts, ſo as to transfer them on ſome line, as in M, from a, to n; alſo divide the in-ſide of F, as from c, to o, into equal parts, ſo as to transfer them on ſome line, as in N, from c, to o; take the diſtance e, a, in F; apply it to the pitch-board, as from g, to e; take the pitch-board I, with it place e, to c, in N; draw the line d, q, and make the point s; divide from d, to s, into eight equal parts, alſo from d, to o, into the ſame number; draw the lines which form a ſweep, whoſe uſe ſhall be hereafter ſhewn.

Likewiſe take the pitch-board I, and apply e, to a, in M; draw the line e, p, and make the point r; from e, to r, divide into eight equal parts; alſo from e, to n, do likewiſe; draw ſtreight lines from each diviſion: That curve ſhews how much wood is wanting on the back of the rail, as b, t, which deſcribe in L, from e, to a; and there deſcribe the bigneſs of the rail; which ſhews how much wood is wanting, as may be obſerved by what was ſaid above. The other part of the twiſt is cut out of a parallel piece, as O. Which thickneſs extraordinary is ſhewn in L, at e, a.

To ſquare the twiſted part of the rail, having ſo much wood extraordinary on the top and bottom, obſerve in F, from a, to e, and from c, to f, muſt be traced, as was above mentioned. Take a, e, in F, apply it to the pitch-board I, it ſhews g, i, which length place in K, from k, to i; alſo take from F, the diſtance b, d, apply it to the pitch-board I, it ſhews g, m, which length place in K, from l, to m. This done, trace out the raking mould K, agreeable to the plan F, by the method before ſhewn, in PLATE P, which by inſpection, and a little practice will become eaſy, and without which nothing is known truly. I ſay the wood extraordinary being accounted for in L, both on the top and the bottom of the rail, obſerve to place your ſtroke f, in its true place, that is, at the beginning of the twiſted part; take the raking mould K, ſet i, to f, in L; there ſtrike it by; with the angle of your pitch-board deſcribe the prick'd line f; by the ſide of the rail, then apply the mould K, to the bottom; ſet i, to this prick'd line, and there deſcribe by it, with your pencil; laſtly, cut that wood away; alſo cut the remaining part of the ſcrole out of the block, as O; then glue theſe together, and bend both moulds M, and N, round the rail; ſtrike them by that, and cut the wood away; ſo will the back of your rail be exactly ſquare, and fit to work.

PLATE X*, Y*.

X--- --- You are always to obſerve this general rule *viz.* to conceive each reſpective paragraph as it occurs, before you begin another; the neglect of which, appears by ſome who cannot conceive the particulars of the foregoing Plate, although I had put it in ſo clear a light.

I have here deſcribed three diſtinct methods of ſquaring the twiſted part of a rail, which may be known, and the rail ſquared, with more eaſe than in the foregoing Plate. But when done, they will not have that agreeable turn, in their twiſted part, as they would have, if done by the foregoing unerring rule, as may more clearly appear, by the following explanation.

That of P*, is the raking mould, taken from K, in PLATE X; *(whoſe uſe and application was therein clearly ſhewn ;)* that of Q*, is the pitch-board, taken from I, in PLATE X; which gives the rake, or declivity of the rail.

In R*, is ſhewn how to ſquare a rail, without bending a templet round the twiſted part thereof; and which is by being guided by the back; firſt deſcribe the bigneſs of the ſtuff to be uſed, as a, b, h, i; which ſhews how much wood will be wanted at bottom; ſuppoſing S*, to be the ſide of the rail. And becauſe the grain of the wood ſhould be agreeable to the falling of the twiſt, therefore conſider how many thickneſſes of ſtuff will make the wood required to cut the twiſt out of; as here three. Therefore as in S*, continue the line a, b; place one foot of your compaſſes in a, make the ſection, or part of a circle c, d; divide it into four parts, as 1, 2, 3, 4, becauſe the rail S*, muſt be always reckoned as one; this by inſpection ſhews how the grain of the wood is to be managed, as appears by the ſhape of the ſeveral pieces, T*, U*, W*, which are better if cut ſo by the pitch-board, before glew'd together.

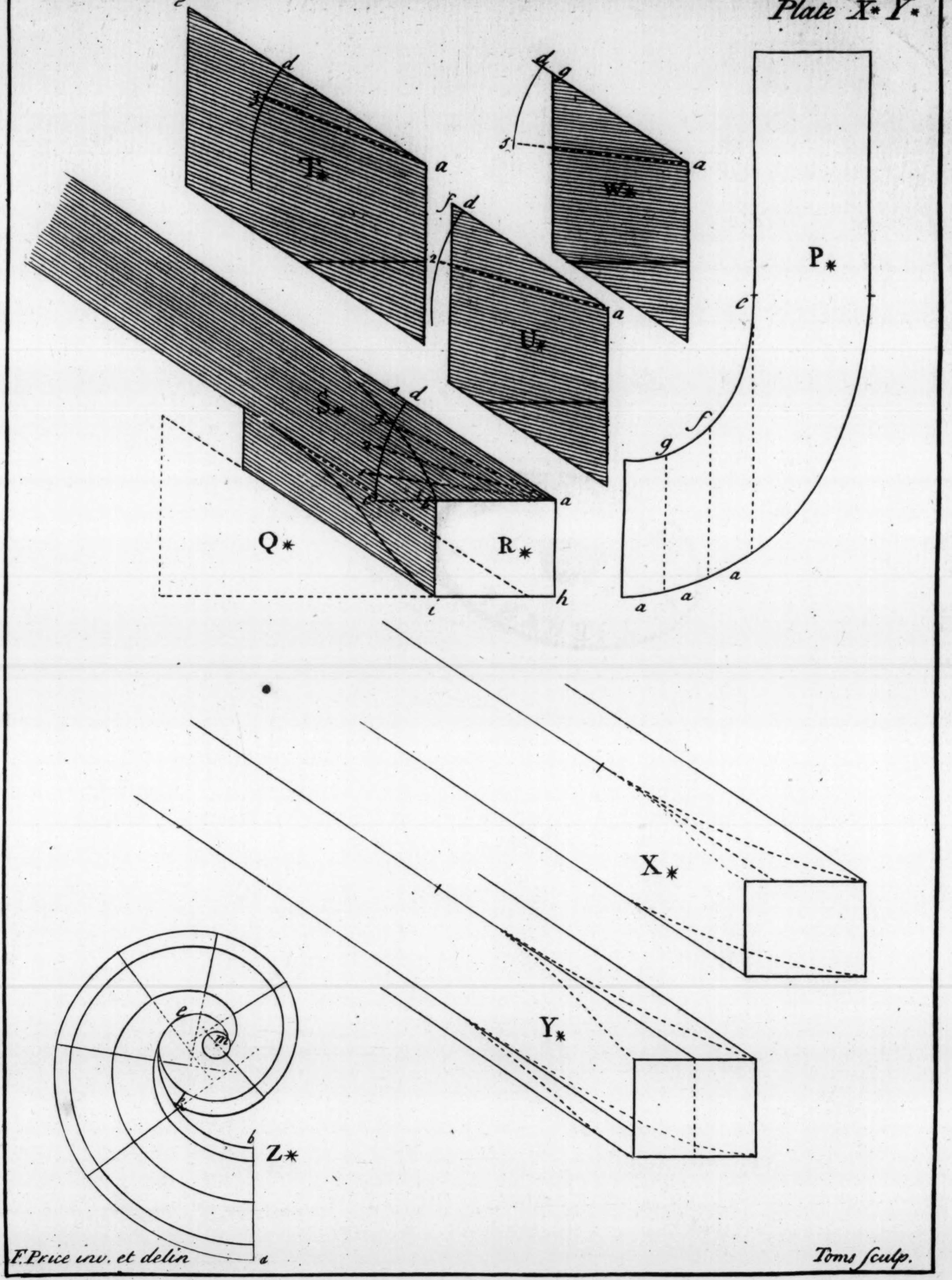
In X*, is ſhewn how to ſquare the twiſted part making the bottom your guide; the ſection ſhews how much wood is wanted on the back.

In Y*, is ſhewn how to ſquare the twiſted part, making a middle line on the back your guide; the ſection ſhews the wood wanting on the back, and at the bottom.

That of Z*, may be cut out of a parallel piece, of the thickneſs of the intended rail, which when it is glewed to the twiſted part, will want little or no humouring.

N. B. There is a nicety in working the mitre thereof, as k, l, m.

Plate X* Y*



F. Price inv. et delin

Toms sculp.

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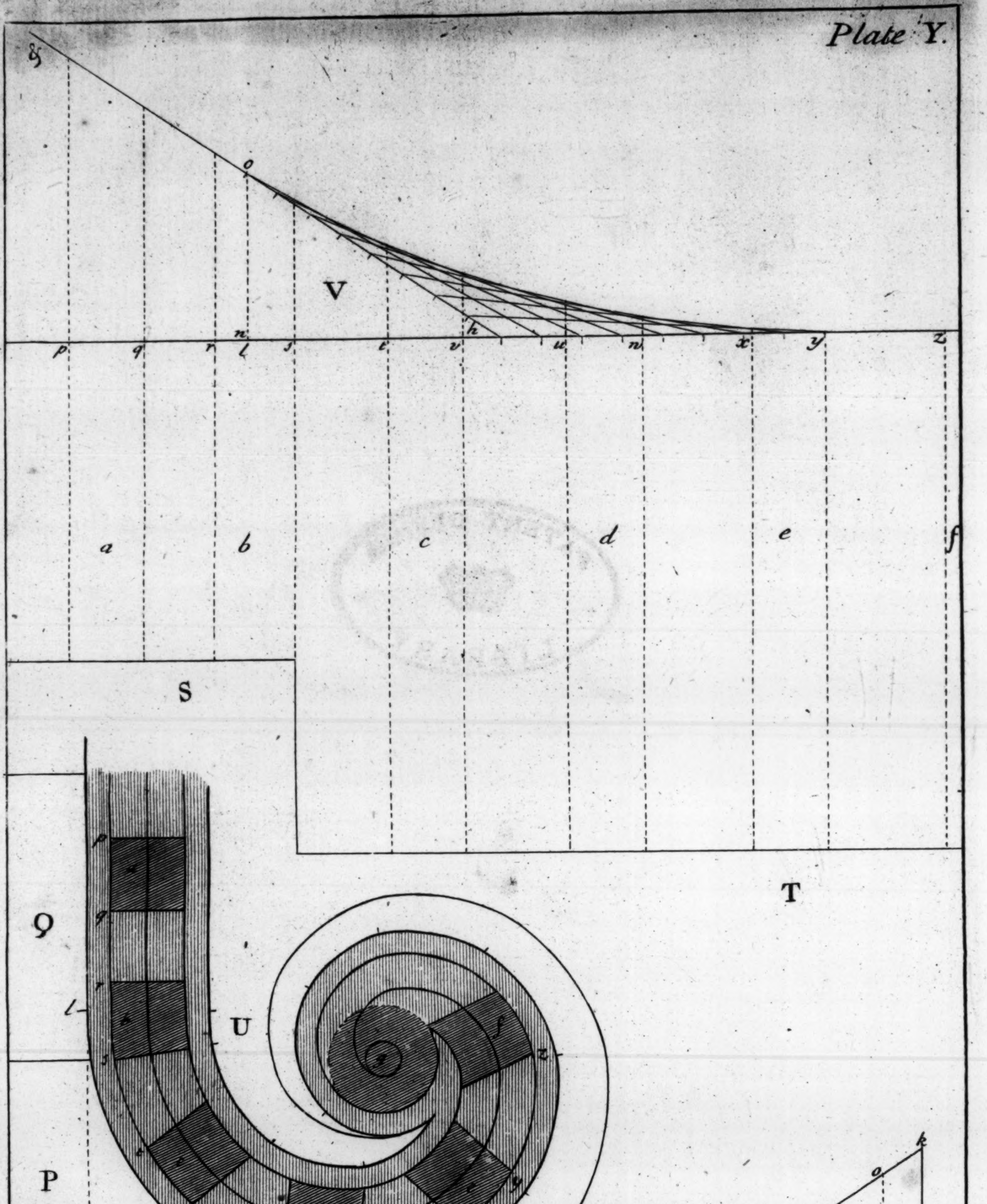
Plate Y.



F. Price inv. et delin.

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PLATE Y.

YOU are to obſerve, the foregoing PLATES muſt be well underſtood, and then, in this PLATE, the lengths of the newel, and balluſters that ſtand under the twiſt or ſcrole are truly deſcribed; that is, their length and bevels may be known before the rail be put up in its place; and that it may prove eaſy, obſerve, the plan of the twiſt or ſcrole is the ſame as before, and ſo are the two ſteps P, and Q, and the pitch-board R.

Firſt, reſolve on the bigneſs of your balluſters, as a, b, c, d, e, f; and alſo the newel. Divide the ſaid balluſters truly on a line drawn in the middle of the rail; for then what is wide on one ſide, is narrow on the other. It is for that reaſon I chuſe to divide them on a middle line. Deſcribe the plan of the balluſters, as p, q; r, s; t, u; u, w; x, y; and z; for there your twiſted part ends; from thence to the eye is level.

Obſerve where your ſcrole begins, as at l; and on ſome line, as above, in V; firſt, make a point at l; then from your plan take the diſtances p, q; r, s; t, v; u, w; x, y; and z: Which transfer, as above, obſerving to have regard to place truly each diſtance from l, both ways, as p, q; r, s; t, v; u, w; x, y; and z. ---- Obſerve alſo, to take from the plan the diſtance from l, to m, which apply to the pitch-board R, as from h, to n, which gives the length h, o; take this pitch-board, and apply it on the line above, which by inſpection the letters will ſhew; this gives the ſlope of the rail, as h, o, &c. From o, to h, and from h, to y, form the curve by equal diviſions, and drawing ſtreight lines, as was before ſhewn.

Laſtly, having the lengths of your fix'd balluſters, as a, b, deſcribe the ſteps S, and T, with the pitch-board. So that by continuing perpendicular lines, from the points on the line firſt terminated, to the ſaid curve, and to the ſteps, you have the accurate lengths of the balluſters, as a, b, c, d, e, f, the newel g, being the ſame length as f, becauſe at f, or z, the twiſted part ends.

The curve of the firſt, or curtail-ſtep P, is form'd by the ſame rule as deliver'd for the plan of the rail.

It may not be amiſs to obſerve, particularly the point of the ſweep, or curve's beginning, and being particular alſo in its application, by which this, and the foregoing, tho' repreſented with but two ſteps, is the ſame in fact, as tho' I had deſcribed a whole flight, to ſhew its uſe.

PLATE

PLATE Z.

ZEALOUS to promote what may be uſeful, in this PLATE, I have made eaſy the difficulty of ſquaring a rail that ramps on a circular baſe.

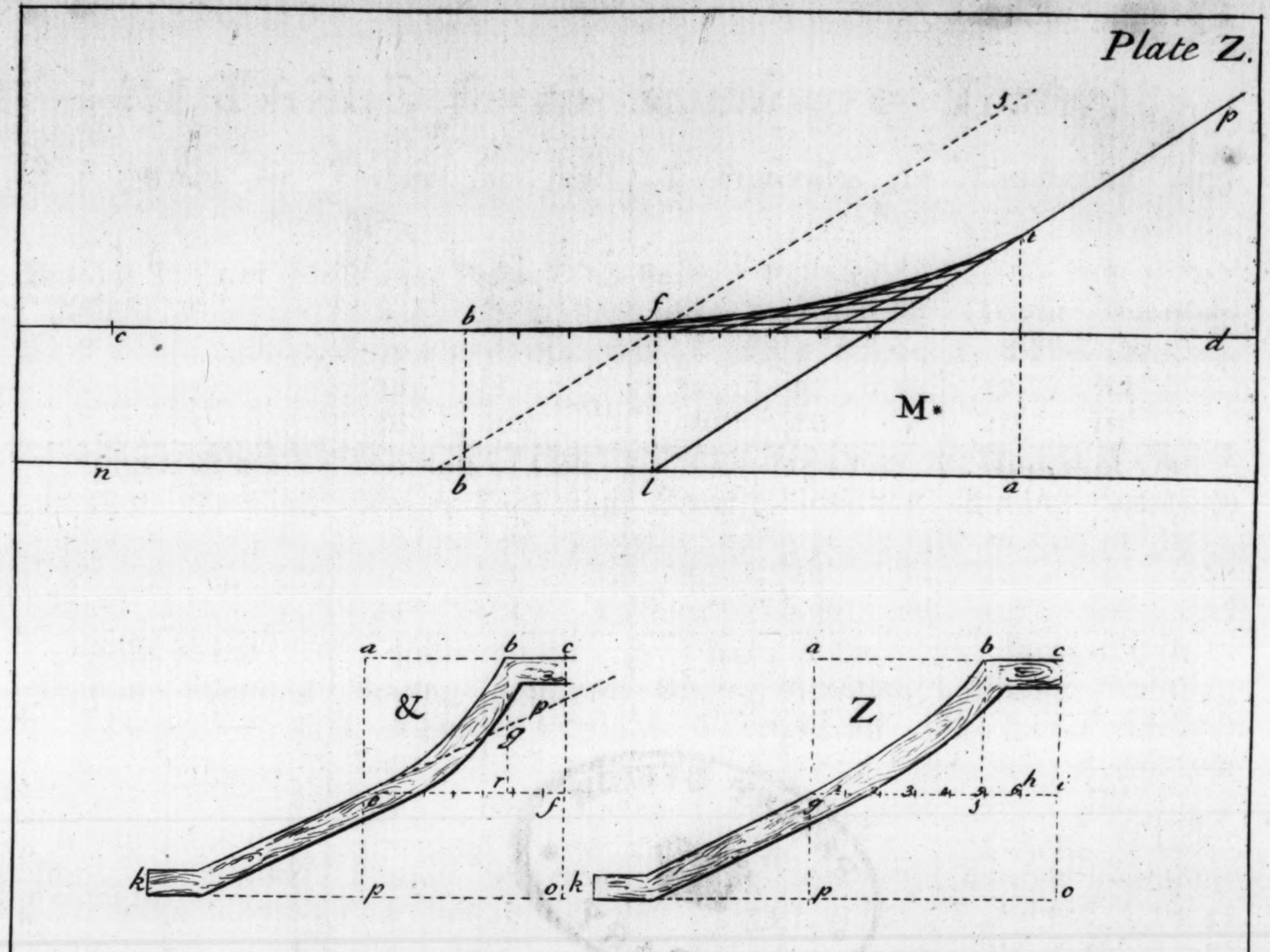
Obſerve, W, is the plan of a ſtair-caſe; and at the landing is a quarter-circle: To make this eaſy; in X, is three ſteps, deſcribed by a larger ſcale, and the ſame method as ſhewn in PLATE V. Likewiſe in Y, is the plan of the rail. It was ſhewn in PLATE X, how to trace out a mould on the rake, agreeable to this plan, or indeed any other. A conſiderable thickneſs of wood more than uſual is required on the back of this rail, as in &, at p, b; which will appear more plain by inſpecting PLATE X: As alſo the method to trace your mould that ſhall bend round the ſaid rail. Let the ſides be ſquared as was ſhewn in PLATE X. Obſerve here in figure X, the line k, p, o; take the diſtance k, p, and place it on ſome line, at pleaſure, as in Z; then divide the outer circle in Y, into a number of equal parts, as into ſix, as from g, to h, which transfer to Z, as g, 1, 2, 3, 4, 5, 6, h. The point of the ramp may be obſerved to fall within the fifth diviſion, as at s, ſo that by the interſection of ſtreight lines, and equal diviſions, you deſcribe the ſweep for the ramp g, b, which makes Z, the mould to bend round the out-ſide of the ſaid rail.

Obſerve alſo in Y, from b, to f, divide it into ſix equal parts, which transfer to &, as from e, to f; (and obſerve again) the ramp falls within the fifth diviſion, as at r. So divide the diſtance from e, to g, and from g, to b, into equal parts, and by drawing ſtreight lines, you have the ſweep b, e. From the point b, to p, is the thickneſs you want to be added extraordinary on the back of the rail &, and which is the inner mould; ſo that by bending both theſe moulds round the rail, and by drawing them with a pencil, and cutting away the ſuperfluous wood you have an exact ſquare back There ſeems no difficulty now left unmentioned, to ſquare twiſted rails in any form whatever.

Becauſe I have all along ſtrove to give variety, obſerve M*; in which is ſhewn a method to have your newel under the twiſt, the ſame length as the reſt; by which means alſo the rail twiſts no farther than the firſt quarter, and conſequently the remaining part may be cut out of a plank, for the thickneſs of your rail, without twiſting at all. There ſeems no explanation wanting to clear this point, but inſpection, and a good conception of PLATE X: In this of M*, l, f, is the thickneſs of wood extraordinary wanting on the back of the rail.

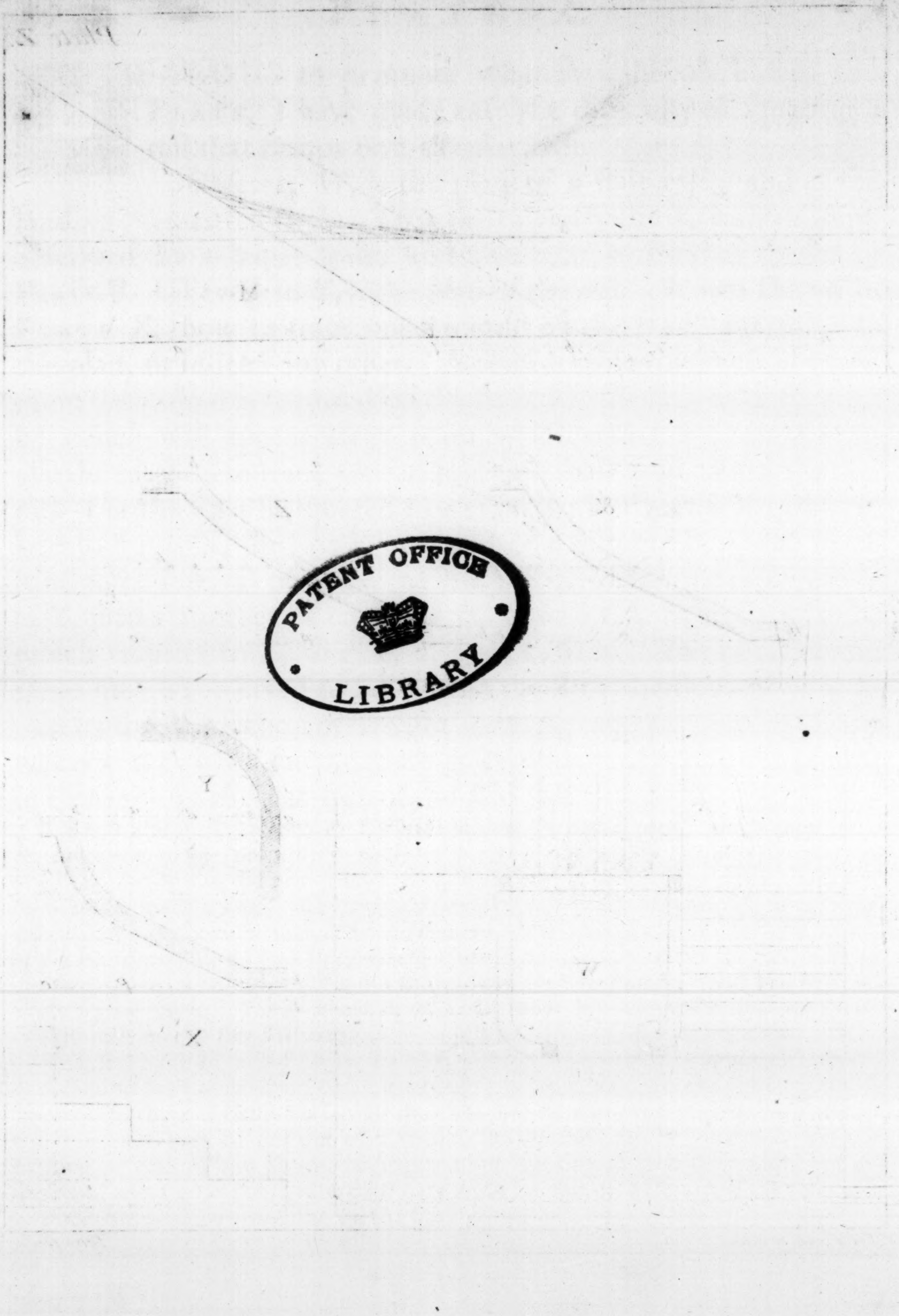
A

Plate Z.



F. Price inv. et delin.

Toms sculp.



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A TABLE *for the Scantlings of Timber.*

A Proportion for Timbers for ſmall Buildings.

Bearing Poſts of Fir		Bearing Poſts of Oak	
Height	Scantling	Height	Scantling
if 8 Feet	4 Inch. Sq	if 10 Feet	6 Inch. Sq.
10	5	12	8
12	6	14	10
Girders of Fir		Girders of Oak	
Bearing	Scantling	Bearing	Scantling
if 16 Feet	8 I. by 11	if 16 Feet	10 I. by 13
20	10 12½	20	12 14
24	12 14	24	14 15
Joiſts of Fir		Joiſts of Oak	
Bearing	Scantling	Bearing	Scantling
if 6 Feet	5 I. by 2½	if 6 Feet	5 I. by 3
9	6½ 2½	9	7½ 3
12	8 2½	12	10 3
Bridgings of Fir		Bridgings of Oak	
Bearing	Scantling	Bearing	Scantling
if 6 Feet	4 I. by 2½	if 6 Feet	4 I. by 3
8	5 2¾	8	5½ 3
10	6 3	10	7 3
Small Rafters of Fir		Small Rafters of Oak	
Bearing	Scantling	Bearing	Scantling
if 8 Feet	3½ I. by 2½	if 8 Feet	4½ I. by 3
10	4½ 2½	10	5½ 3
12	5½ 2½	12	6½ 3
Beams of Fir, or Tyes		Beams of Oak, or Tyes	
Length	Scantling	Length	Scantling
if 30 Feet	6 I. by 7	if 30 Feet	7 I. by 8
45	9 8½	45	10 11½
60	12 11	60	13 15

Principal Rafters of Fir, ſcantling			Principal Rafters of Oak, ſcantling		
Lgth	Top	Botm.	Lgth.	Top	Botm.
if 24ft	5 I. & 6	6 I. & 7	if 24ft	7 I. & 8	8 I. & 9
36	6½ 8	8 10	36	8 9	9 10½
48	8 10	10 12	48	9 10	10 12

A Proportion for Timbers of large Buildings.

Bearing Poſts of Fir		Bearing Poſts of Oak	
Height	Scantling	Height	Scantling
if 8 Feet	5 Inch. Sq	if 8 Feet	8 Inch. Sq.
12	8	12	12
16	10	16	16
Girders of Fir		Girders of Oak	
Bearing	Scantling	Bearing	Scantling
if 16 Feet	9½ I. by 13	if 16 Feet	12 I. by 14
20	12 14	20	15 15
24	13½ 15	24	18 16
Joiſts of Fir		Joiſts of Oak	
Bearing	Scantling	Bearing	Scantling
if 6 Feet	5 I. by 3	if 6 Feet	6 I. by 3
9	7½ 3	9	9 3
12	10 3	12	12 3
Bridgings of Fir		Bridgings of Oak	
Bearing	Scantling	Bearing	Scantling
if 6 Feet	4 I. by 3	if 6 Feet	5 I. by 3½
8	5½ 3	8	6½ 3½
10	7 3	10	8 3½
Small Rafters of Fir		Small Rafters of Oak	
Bearing	Scantling	Bearing	Scantling
if 8 Feet	4½ I. by 3	if 8 Feet	5½ I. by 3
10	5½ 3	10	7 3
12	6½ 3	12	9 3
Beams of Fir, or Tyes		Beams of Oak, or Tyes	
Length	Scantling	Length	Scantling
if 30 Feet	7 I. by 8	if 30 Feet	8 I. by 9
45	10 11½	45	11 12½
60	13 15	60	14 16

Principal Rafters of Fir, ſcantling			Principal Rafters of Oak, ſcantling		
Lgth.	Top	Botm.	Lgth.	Top	Botm.
if 24ft.	7 I. & 8	8 I. & 9	if 24ft	8 I. & 9	9 I. & 10
36	8 9	9 10½	36	9 10	10 12
48	9 10	10 12	48	10 12	12 14

ALTHO' this table ſeems ſo plain as to need no explanation, it may not be amiſs to obſerve ſome particulars, ſuch as that all binding or ſtrong-joiſts ought to be half as thick again as common-joiſts; that is, if a common-joiſt be given three inches thick, a binding-joiſt ſhould be four inches and a half thick, altho' the ſame depth.

Obſerve alſo, that if conveniency do not allow of poſts in partitions being ſquare, in ſuch caſes multiply the ſquare of the ſide of the poſts, as here given, by itſelf: For inſtance, if it be ſix inches ſquare, then as ſix times ſix is thirty ſix, conſequently to keep this poſt nearly to the ſame ſtrength, find ſome number that ſhall agree thereto; as ſuppoſe the partition to be four inches thick, then let your poſt be nine inches the other way, ſo that nine times four is thirty ſix, being the ſame as ſix times ſix; ſo that the ſtrength is nearly the ſame, altho' being equal in its ſquares is beſt for the ſtrength.

Poſts that go the height of two or three ſtories, need not hold this proportion, becauſe at every floor it will meet with a tye; admit a poſt was required of thirty feet high, and in this height was three ſtories; two of ten feet, and one of eight. Look for poſt of fir of ten feet high, their ſcantling is 5 inches ſquare, *i. e.* 25 ſquare inches; which double for the two ſtories.

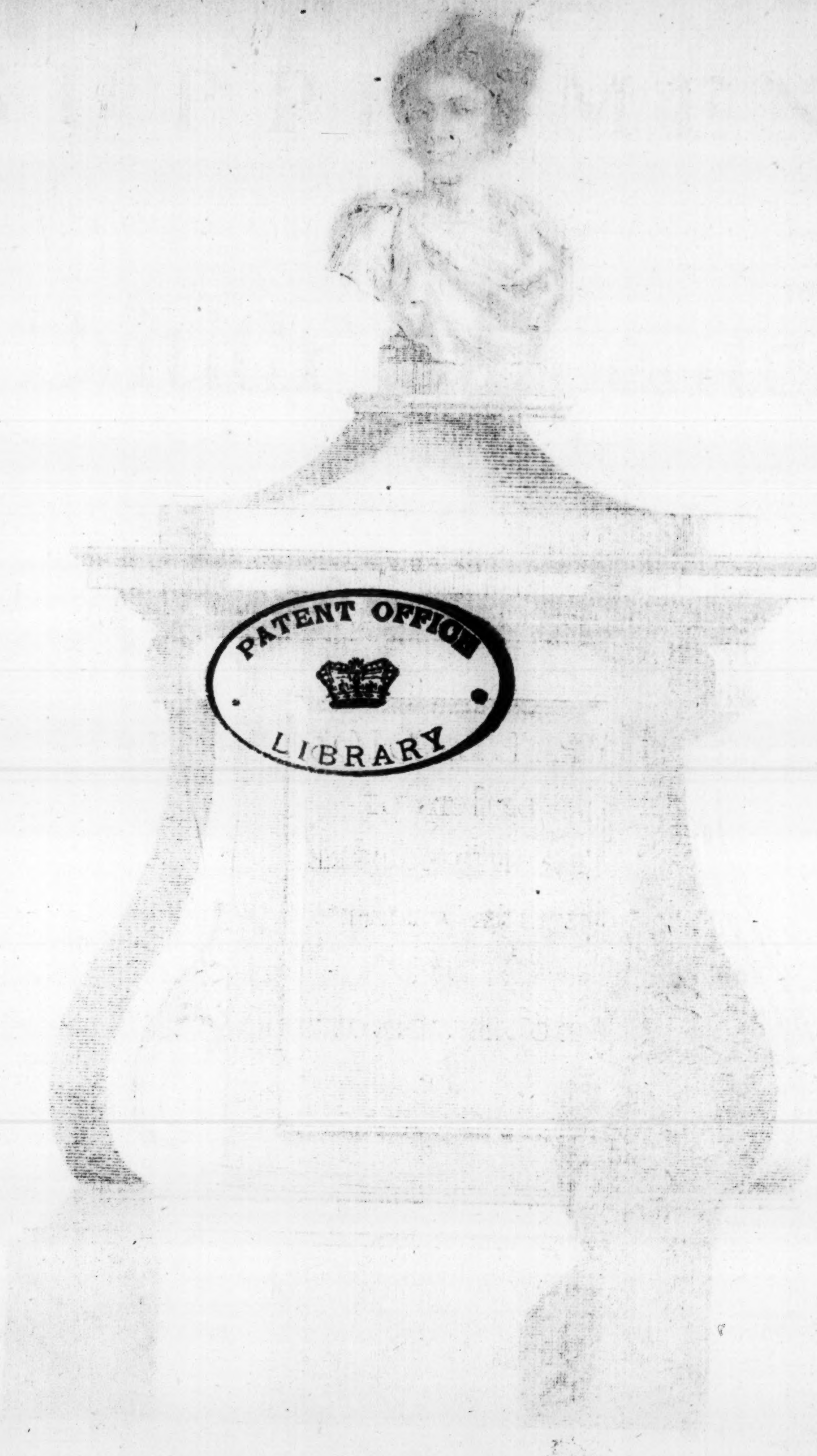
And take alſo that of 8 feet high, being 4 inches ſquare, *i. e.* 16 ſquare inches, all which being added together make 64 ſquare inches; ſo that ſuch a poſt would be 8 inches ſquare. On occaſion it may be leſſen'd in each ſtory as it riſes.

I do not inſiſt that the ſcantlings of timber ought to be exactly as by this table is expreſs'd, but may be varied in ſome reſpects, as the workmen ſhall ſee fit; the reaſon of its being inſerted is in conſideration of the ſcantlings of timber, as formally ſettled by act of parliament, and which if compared will prove the neceſſity, and uſe of this table.

As to plates on walls, or breaſt-ſummers to ſupport walls, I do not find they can come into any regular proportion, as the reſt do, therefore muſt be left to diſcretion.

And as I have herein deſcribed a great variety of the principal things requiſite to be known by every carpenter, I ſhall conclude this part with my wiſhes that it may prove as uſeful as my earneſt endeavours have been to make it ſo.

The End of the Carpentry.



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A

SUPPLEMENT

TO THE

Britiſh Carpenter:

CONTAINING

PALLADIO's

ORDERS of ARCHITECTURE,

WITH THE

Ornaments of DOORS and WINDOWS,

Proportion'd and adjuſted by DIVISIONS on SCALES; together with the accurate CURVES of their MOULDINGS, and their Application to USE.

By *FRANCIS PRICE*,
Late Surveyor to the Cathedral Church of *Saliſbury*.

LONDON:
Printed by C. and J. ACKERS, in St. *John's-Street*;
And Sold by C. HITCH and L. HAWES, and R. BALDWIN, in *Pater-Noſter-Row*.
M.DCC.LIII.

TO THE

READER.

I HAVE herein preſented the publick with the five orders of ARCHITECTURE, according to that moſt judicious maſter ANDREA PALLADIO, together with the ornaments of DOORS, WINDOWS, *&c.* and their application to uſe, after a method much eaſier in practice than any thing of the kind; which I have by many perſons been importuned to do, that thereby the whole might be render'd of general uſe to the ſeveral artificers in building. Altho' it may not appear to every one, that theſe are the proportions of PALLADIO, I am fully convinc'd every competent judge will ſoon diſcern it, (and every other perſon that would be ſatisfy'd, may, by obſervation and compare, find it to be ſo;) therefore I ſhall not trouble the reader with quotations, to prove the veracity thereof.

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Plate A.

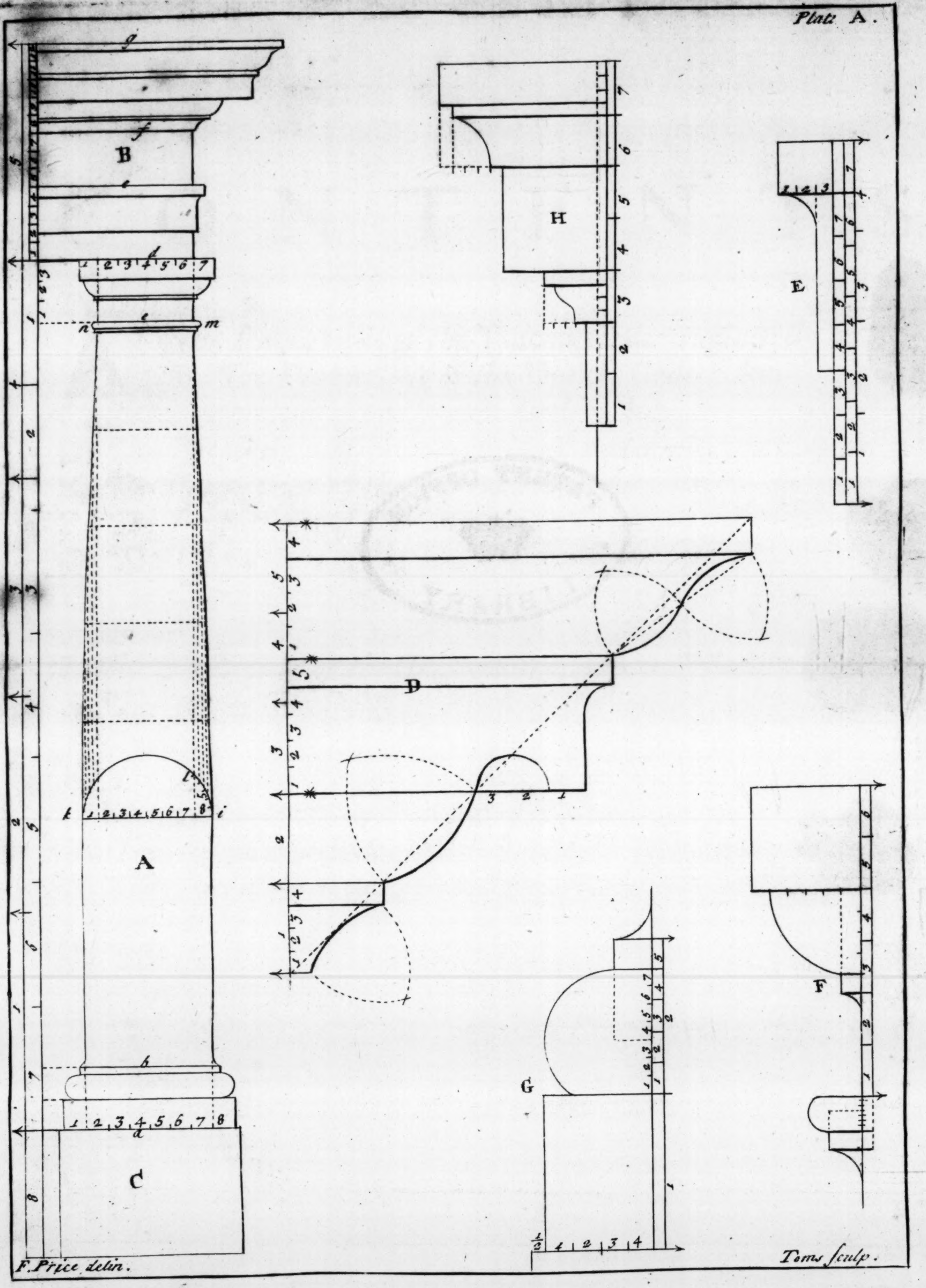

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PLATE A.

The Proportions of the TUSCAN ORDER.

THE column A, is ſeven of its diameters in height including its baſe a, b, and capital c, d; each having half the diameter of the column. The entablature B, is one fourth of the length of the ſaid column; which being divided into twelve parts, four is for the architrave d, e, three for the freeze e, f, and five for the cornice f, g. The plinth C, is one diameter of the column, as appears by the ſcale. So that a height being given for this order, divide it into thirty-nine equal parts; four will be the diameter of the column; by which the other parts are proportion'd.

The baſe a, b, projects one ſixth part of the diameter of the column on each ſide. The ſhaft diminiſhes one fourth part of the diameter below; for which diminiſhing, divide the length of the ſhaft b, c, into three parts, leaving the lower part perpendicular. On the ſaid third part i, k, deſcribe a ſemi-circle obſerving where the diminution paſſes through it as at l; from i, to l, divide into parts at pleaſure, as here, into five; obſerving to divide the upper two thirds of the ſhaft, into the ſame number; drawing baſe lines from the one, and perpendiculars from the other, their meeting gives an agreeable curve for the ſwelling of the column.

Note, The aſtragal m, n, is reckon'd a part of the column.

The projecture of the capital e, d, is found by dividing the diminiſhed part of the ſhaft into five equal parts, one of which is for the ſaid projecture, the architrave d, e, projects one ſeventh of its height, and the cornice f, g, projects equal to its height. And that the particular parts may appear the better, each is enlarged: D, being the cornice, whoſe particulars appear by inſpection. E, is the architrave, enlarged agreeable to that of the cornice, as alſo the capital F, and the baſe G, whoſe projecture is divided into four parts, which ſhews the projection of the plinth. That of H, is the impoſt of the arch, whoſe height is found by dividing the diameter of the column into twelve parts; ſeven of which is the height thereof, and three is its projecture.

By obſerving the ſeveral ſcales duly, there needs no farther explanation.

PLATE B.

The Proportions of the DORICK ORDER.

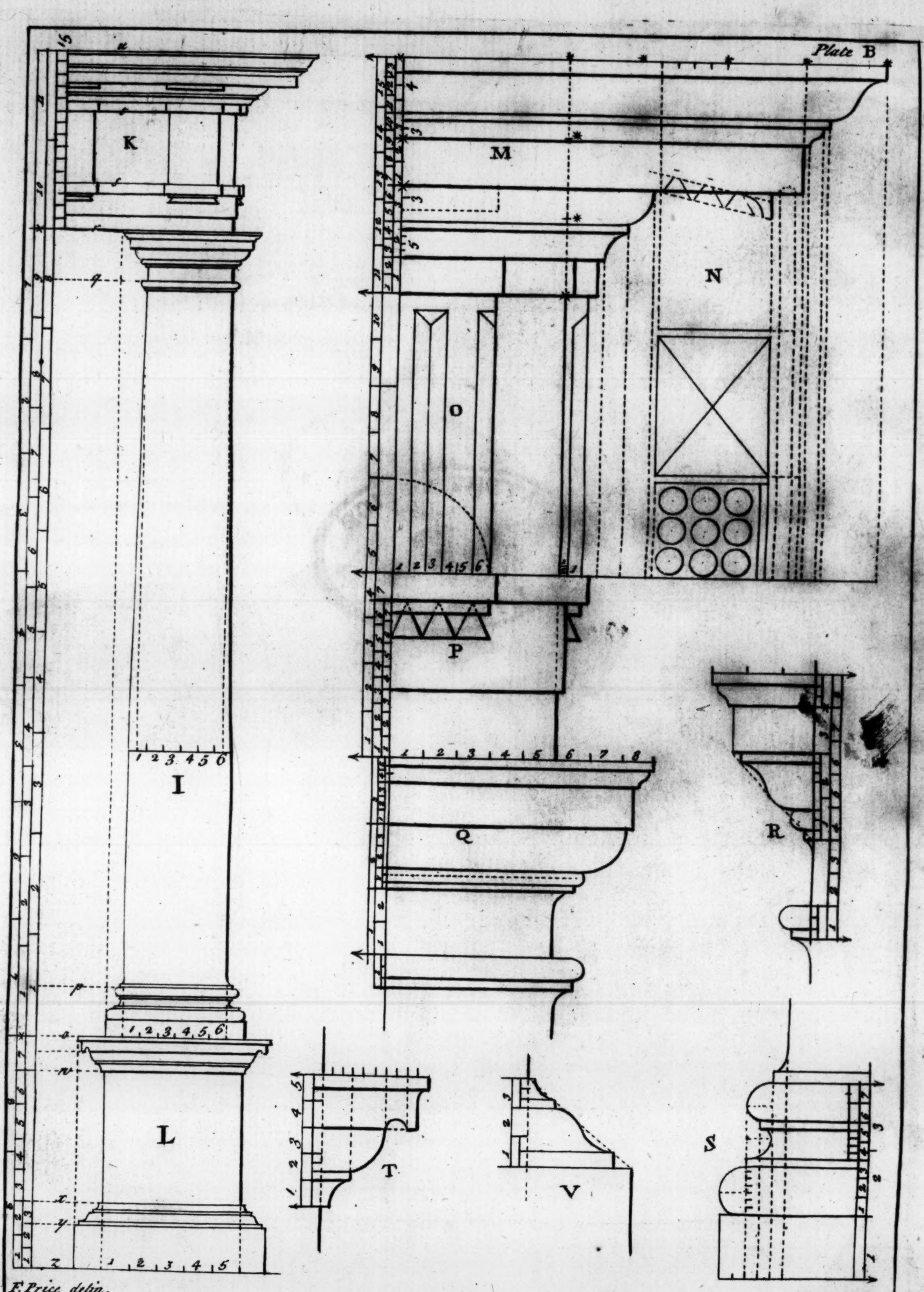
THE column I, is eight diameters high, including its baſe, o, p, and capital q, r, each having half the diameter of the column. The entablature K, is two ſuch parts as the length of the column contains nine; which is divided into fifteen parts, four for the architrave r, s, ſix for the freeze s, t, and five for the cornice t, u. The pedeſtal L, contains two ſuch parts as the length of the column does ſeven; which being divided into ſeven parts, one is for the caping o, w; four for the die w, x, and two for the baſe, and plinth x, z, z; which being divided into three parts, one is for the baſe x, y, and two for the plinth y, z, as appears by the ſcale. So that a height being given for this order, divide it into one hundred and forty-five parts, twelve will be the diameter of the column; (by which the other parts are proportion'd.)

The baſe o, p, projects one ſixth part of the diameter of the column, on each ſide, which gives the breadth of the die of the pedeſtal; and the breadth of the die, or trunk of the pedeſtal, being divided into five parts, one is for the projecture of the caping o, w, and baſe x, y. The ſaid column diminiſhes one ſixth part of its diameter at bottom, the capital q, r, projects one fourth part of the ſaid diameter. The architrave r, s, projects one ſeventh of its height, the freeze s, t, is adorned with trigliphs, and metops; the trigliphs being in breadth, equal to two thirds of their height. And the metops or ſpace between is perfect ſquare. The cornice t, u, projects four ſuch parts as its height contains three.

And that the particular parts may appear plain, they are enlarged. M, being the cornice, and N, part of its ſofeit, that of O, being the freeze, and P, the architrave, alſo Q, is the capital, and R, the impoſt of the arch; its height being two thirds of the diameter of the column, including its aſtragal, and its projecture is one fourth. S, is the baſe of the column, T, the caping of the pedeſtal, and U, the baſe, or mouldings thereof.

By obſerving the ſeveral ſcales duly, a farther explanation is needleſs; without it be the projecture of the ſeveral mouldings, moſt of which come under one rule, *viz.* all ogees, quarter-rounds, and hollows project with their liſts, equal to their naked height; the ſaid liſts projecting one ſixth part of that naked height, as may appear. The cymas project equal to their height, and the curves of each member are thus; all hollows and rounds are deſcribed by placing one foot of the compaſſes on the line that ſeparates the member from its liſt, and the cymas and ogees are form'd by the point of an equilateral triangle, as may appear by inſpction.

Plate B



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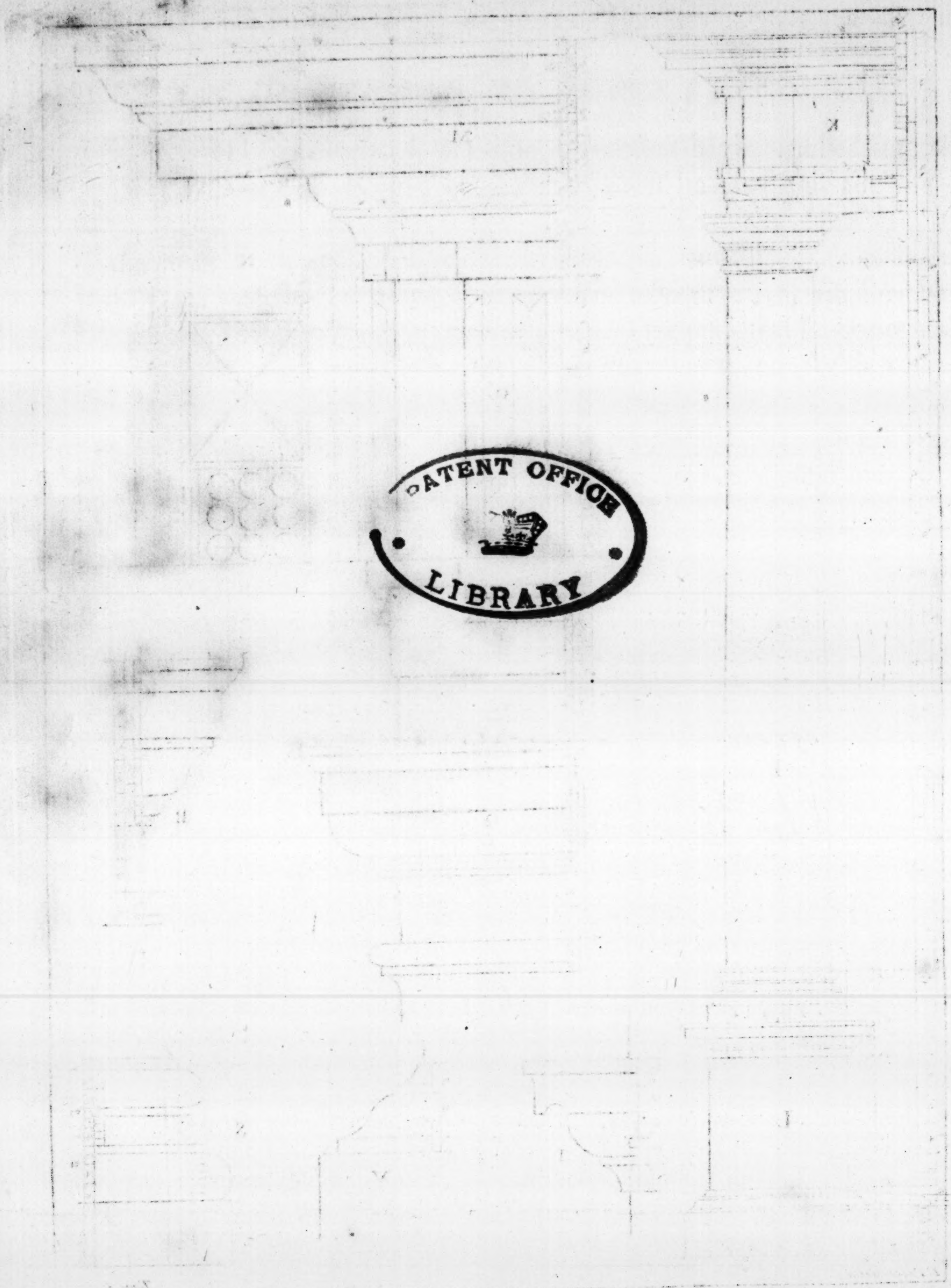

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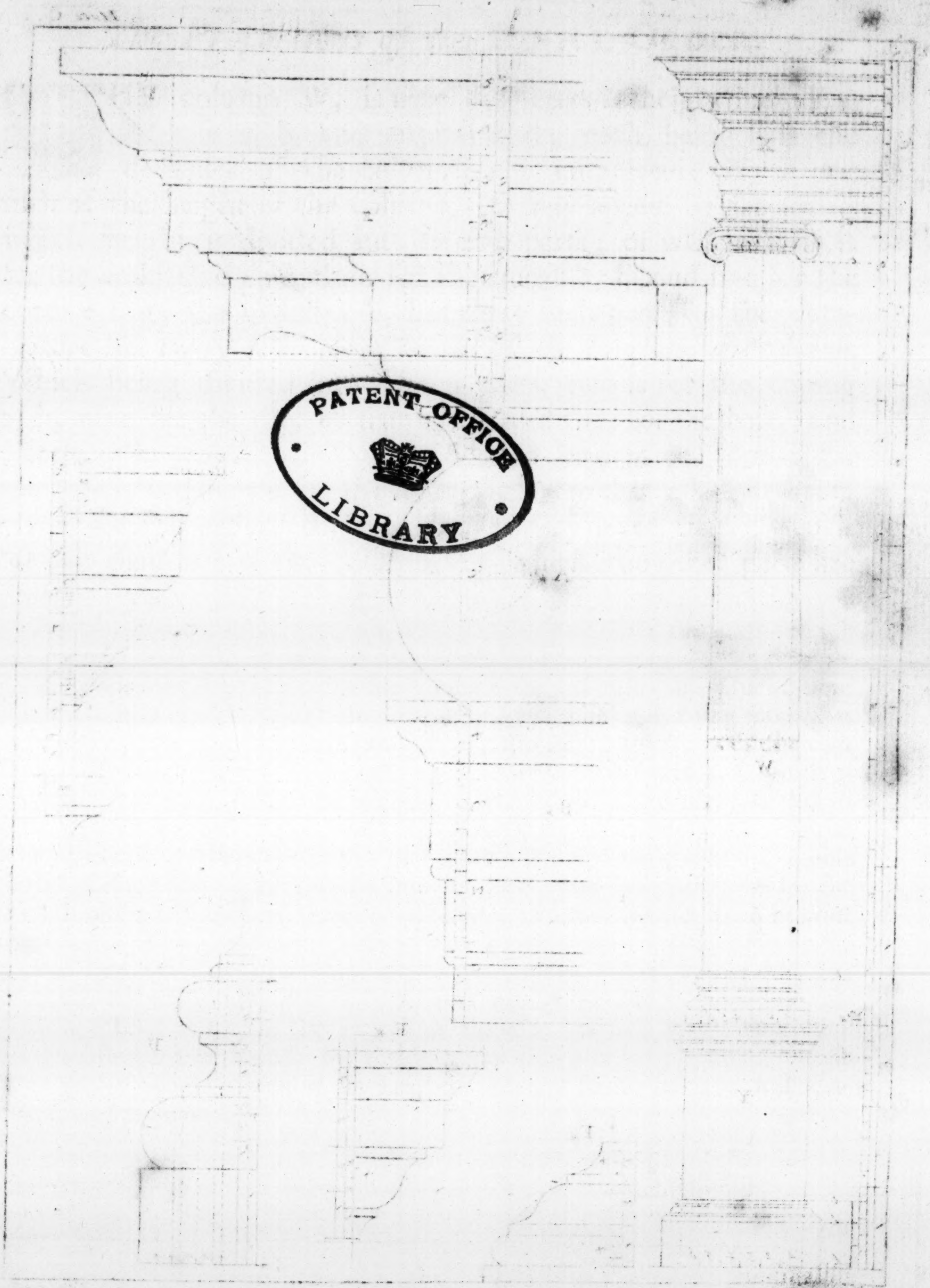
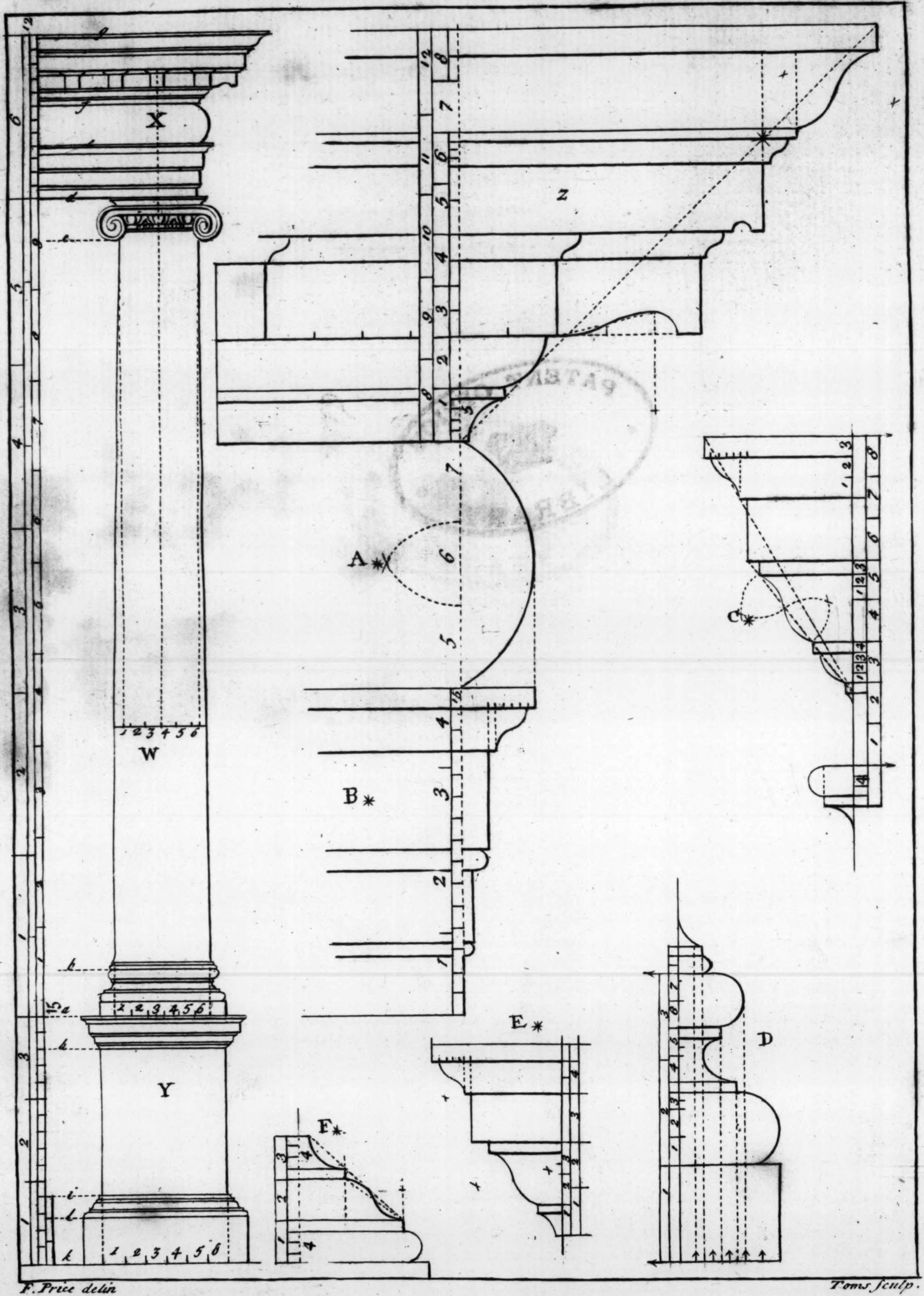


Plate C.



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The Proportions of the IONICK ORDER.

THE column W, is nine diameters in height including its baſe a, b, and capital c, d; each being half the diameter of the column, the entablature X, is one fifth of the height of the column, (as may appear by the ſcale,) which height is divided into twelve parts; of which, four is for the architrave d, e, three for the freeze e, f, and five for the cornice f, g; the pedeſtal Y, has three ſuch parts, as the entablature has two; *i. e. three tenths of the height of the column.* Which being divided into fifteen parts, two is for the caping a, h, nine for the die, or trunk h, i, and four for the baſe, and plinth i, k, which being again divided into three; one is for the baſe i, l, and two for the plinth l, k; ſo that a height being given for this order, divide it into twenty-ſeven parts; two is for the diameter of the column, by which the other parts are proportion'd.

The baſe of the column a, b, projects one ſixth part of the diameter on each ſide, which gives the breadth of the pedeſtal; which being divided into ſix parts, one is for the projecture of the caping a, h, and baſe i, l. This column alſo diminiſhes one ſixth part of its diameter. The capital e, d, being ſomewhat more difficult to conceive, than the former; therefore I reſerve it for the next Plate. The architrave d, e, projects equal to that of the freeze e, f, which is found by making an equilateral triangle, of the middle third part; ſo that its point is the center for the curve, which gives the ſaid projecture of the architrave. The cornice f, g, projects equal to its height. To find the modilion, divide the diminiſhed part of the column into ten parts; two ſuch parts, are for the breadth of each modilion; three for its length, and four for the ſpace betwixt them.

And that the particular parts may appear plain, I have enlarged them; as in Z, A*, B*, D*, E*, F*, ſo that inſpection will explain the particulars. That of C*, is the impoſt of the arch, whoſe height (excluſive of the aſtragal,) is found, by dividing the diameter of the column into three parts; two of which is its height, and one fourth of the ſaid diameter is its projecture.

The Proportions of the IONICK CAPITAL.

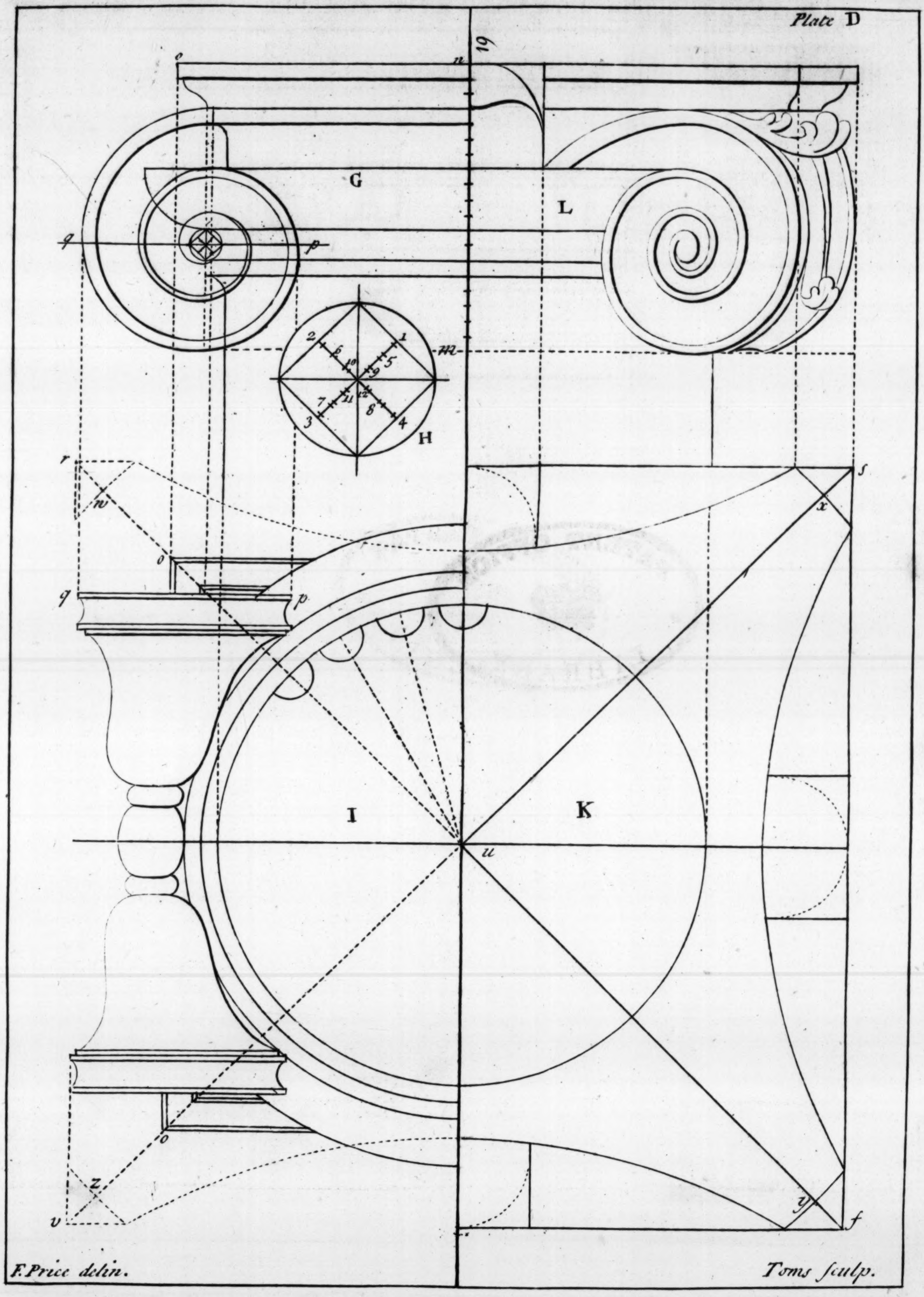
THE height m, n, (being half the diameter of the column,) is divided into nineteen equal parts; of which, three is for the ogee, with its liſt; one for the liſt or rim of the ſcrole; three for the receſs; four for the ovola; and two for the aſtragal, which is the eye or volute; on which are deſcribed the thirteen centers, by which the ſaid ſcrole is formed. The projection of the ſaid capital G, as n, o, is equal to the diameter of the column below; by limiting the projecture of the ogee, drop a perpendicular from the foot thereof; obſerving where it paſſes through the ſaid aſtragal, for that is the center of the volute; which is enlarged as in H; ſo that the particular centers, for forming the ſpiral line or ſcrole, may appear by inſpection. And becauſe the ſaid ſcrole is ſpiral, therefore betwixt the centers that are marked 1, 2, 3, 4, *&c.* divide each, into four equal parts, ſo that the part next to the ſaid marked centers, is the centers for forming the ſaid ſpiral, or diminiſhing of the ſcrole. The other parts inſpection will explain. From this elevation G, the plan I, is made, as the letters and prick'd lines ſhew.

If this column, or the following ones, be fluted, it has twenty-four flutes, which are thus made; the two diameters croſſing each other at right angles, and the diagonal lines, being drawn, divides the plan into eight equal parts. So that by dividing each again into three, gives the centers for deſcribing each flute; the liſt betwixt each being one third of the ſaid flute. If the ſaid column be fluted, then all the proper parts ſhould be carved, and the pedeſtal ſhould be opened with a pannel, whoſe extent is equal to the diameter of the column above; not but on occaſion, there may be ornaments left ſwelling beyond the die of the pedeſtal, equal to the bigneſs of the column as before.

Note, *In this caſe the adjoining parts ſhould be inriched in proportion, which is eſteemed an eſſential part of ſymmetry.*

And in conſideration, that this antient capital, is not ſo frequently uſed, as the modern one; therefore I have inſerted it as on the other half of the ſaid plan, as K, and in the other half of the elevation, as L, which is thus. Make a geometrical ſquare, equal to one diameter, and one third of the column; as r, s, t, u; *laſtly*, divide the diameter of the column into eight parts; take ſeven thereof, and place on the diagonal lines, as from the center u, to w, x, y, z, which being drawn parallel to the diagonals, obſerve where it croſſes the ſaid ſquare r, s, t, u, for that terminates the horns of the abacus, whoſe curvature is formed by the point of an equilateral triangle, being equal to the points marked on the ſides of the ſaid ſquare. The flower in the middle of each face, is one fourth part of the diameter of the column.

Plate D



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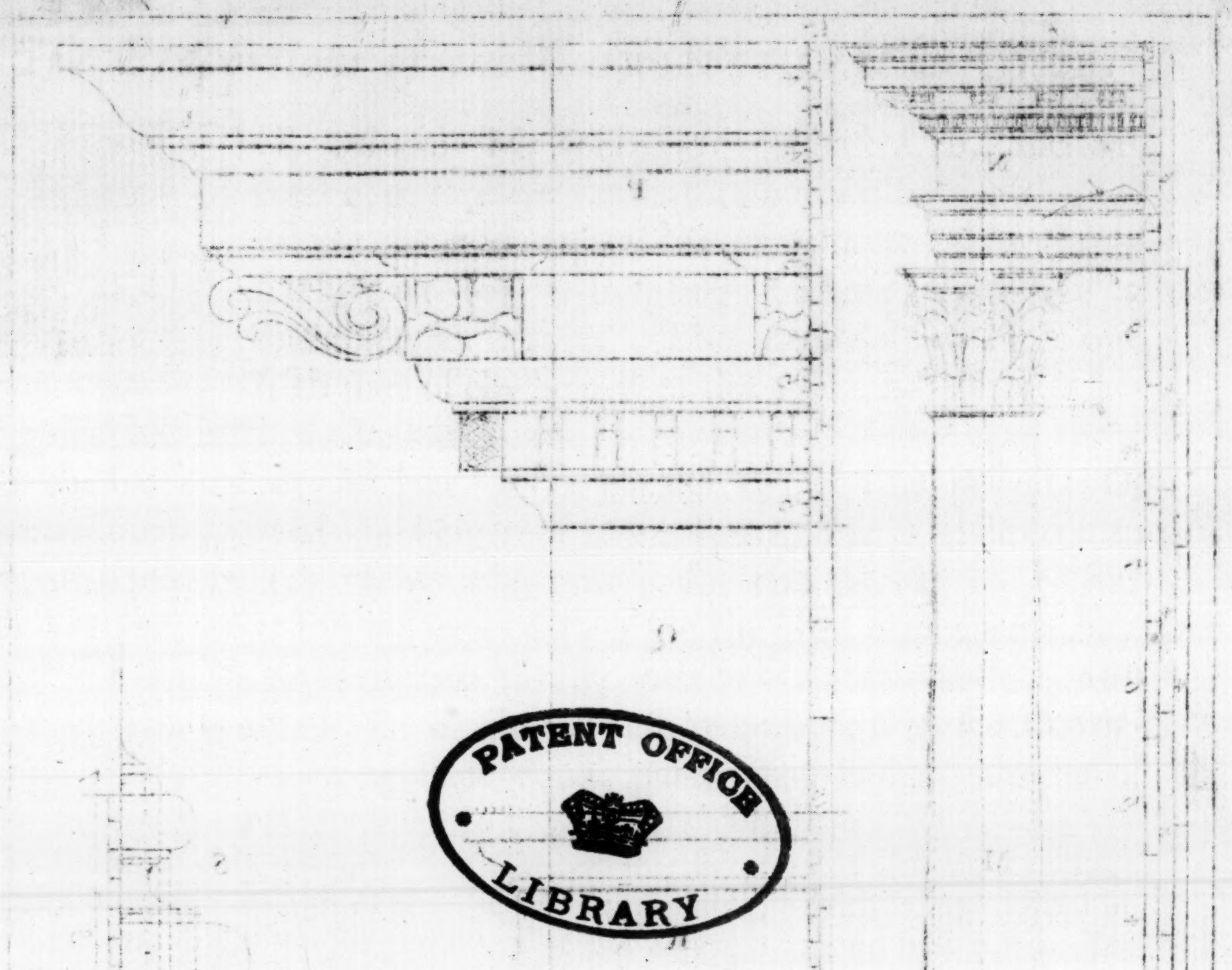

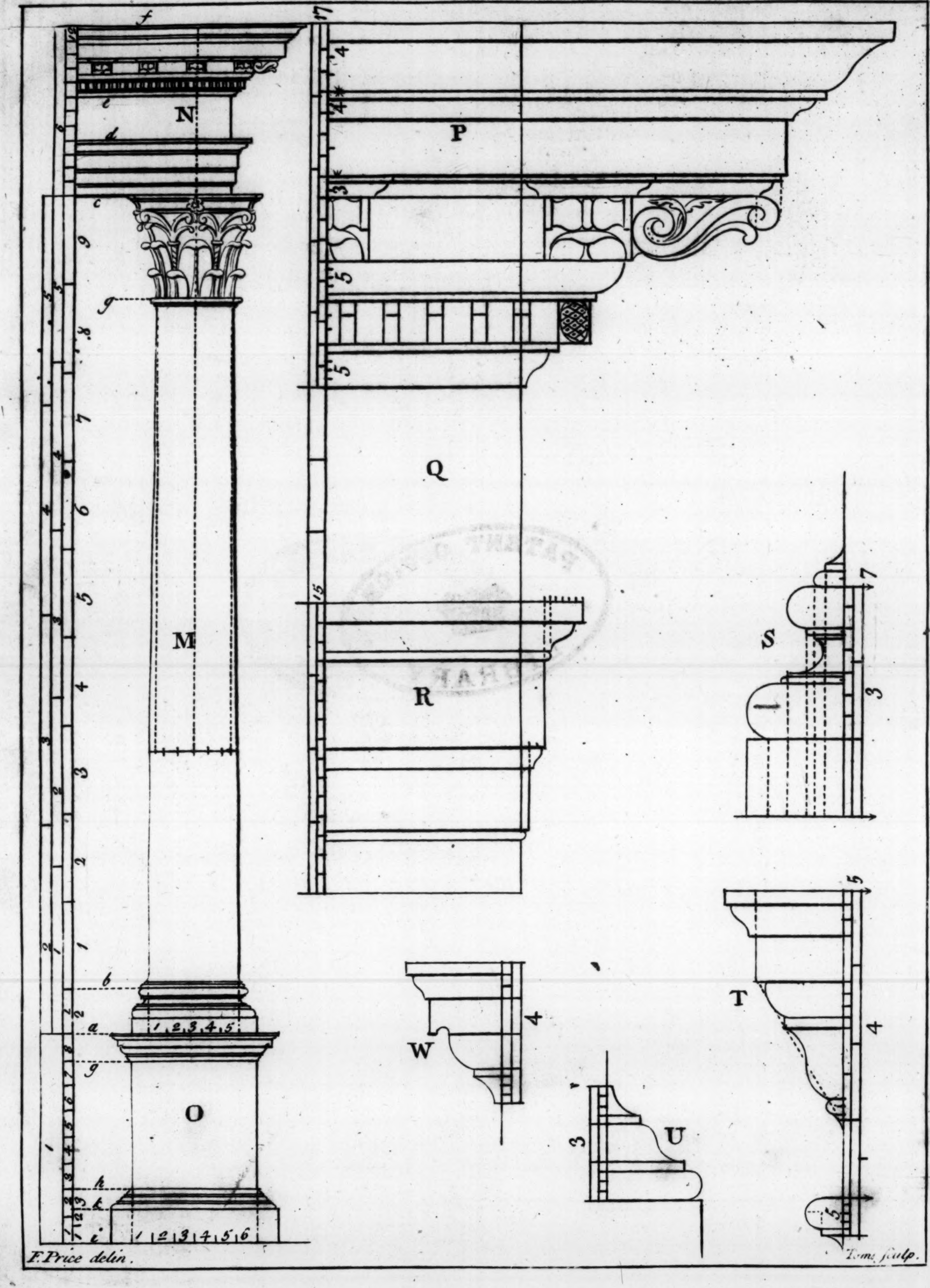

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The Proportions of the CORINTHIAN ORDER.

THE column M, including its baſe a, b, and capital c, g, is nine diameters and an half high; of which the ſaid capital has one diameter, and one ſixth part for its height; the baſe being half a diameter as before. The entablature N, is one fifth part of the height of the column. Which being divided into twelve parts, four is for the architrave c, d, three for the freeze d, e, and five for the cornice e, f. The pedeſtal O, is one fourth part of the height of the column, and is divided into eight equal parts; of which, one is for the caping a, g, five for the die, or trunk g, h, and two for the baſe and plinth h, i, which is again divided into three; one is for the baſe h, k, and two for the plinth k, i. So that a height being given for this order, divide it into ſixty-nine equal parts; five is the diameter of the column, which proportions the reſt as before.

The baſe a, b, projects one fifth of the diameter of the ſaid column, which gives the breadth of the die of the pedeſtal; which being divided into ſix parts, one is for the projecture of the caping a, g, and baſe h, k. This capital g, c, requires to be explained by itſelf, therefore will be inſerted on the next Plate. The architrave c, d, projects one fifth part of its height, the freeze d, e, is perpendicular to the diminiſhed part of the column, (which is one ſixth as before,) the cornice e, f, projects equal to its height, which being divided into ſeventeen parts, five is for the projecture of the bed-moulding; ſeven for the length of the modilion; and the other five for that of the cornice; the breadth of each modilion is four ſuch parts; and the ſpace betwixt is eight. And to adjuſt the dentils, divide their height into three parts, two of which is their projecture, and width, and one is for the ſpace between each.

And that the particular parts may appear plain, obſerve, as in P, Q, R, S, U, W, each part is enlarged. And if the diviſions or ſcales, be duly obſerved, there needs no farther explanation, otherways than that T, is the impoſt of the arch, whoſe height is two thirds of the diameter of the column; excluſive of its aſtragal, the projecture of the ſaid impoſt, is one fourth of the diameter of the column.

PLATE F.

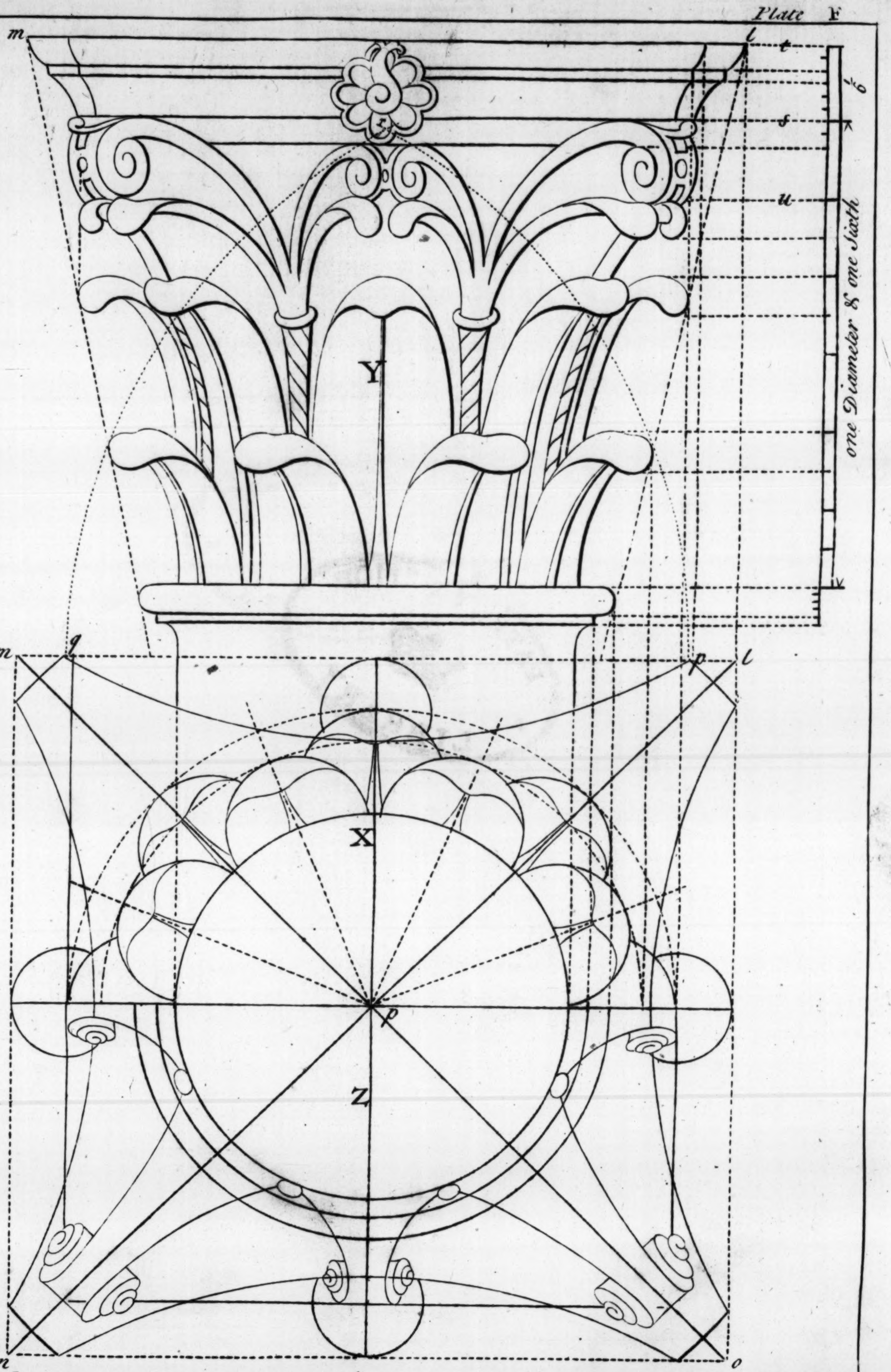
The Proportions of the CORINTHIAN CAPITAL.

TO form this capital, a geometrical ſquare muſt be made equal to one diameter and an half of the column, as l, m, n, o; draw the diagonal lines m, o, l, n, and from the center p, mark one diameter of the column on the ſaid diagonals, obſerving where it paſſes through the ſides of the ſaid ſquare, which terminates the horns of the abacus, ſo that by making an equilateral triangle with the part remaining, between the points ſo terminated, as p, q, r; its point will be the center for deſcribing the curvature of the abacus. So that from the half of the plan as X, is made the elevation Y; whoſe height is one diameter, and one ſixth of the column, and is divided into ſeven parts; of one is made the abacus s, t, and of the other, is made the head of the ſcroles, s, u; So that the remaining five, is for the leaves, as inſpection ſhews. To find the projecture of the ſaid leaves, draw a line from the extremity of the abacus, to that of the aſtragal of the column, to which the tip or head of the leaves come.

As to the poſition of the leaves, perpendiculars are let fall from the elevation Y, to the plan X; as the prick'd lines ſhew. There are eight leaves in each of the firſt and ſecond tire; and between the latter are ſtalks, as is ſhewn in the other part of the plan, as *Z*; from whence ſpring the upper tire of leaves, as alſo the ſcroles, each of which are in number ſixteen, from the ſaid plan X, Z; the particulars of the elevation Y, are ſhaped, as inſpection will make appear; the flower in the middle of the abacus, is in breadth and in height, one fourth part of the diameter of the column; its plan being a portion of a circle. As to the other particulars, due inſpection and practice only will make them intelligible. The aſtragal is reckoned as a part of the column, and is one twelfth of the diameter thereof in height, its projection being the ſame.

The cutting in of the leaves, ſhould be no deeper than the bottom of the flutes, ſo that the bell of the capital, is equal to the ſolid part of the column; the liſts between the flutes give the bigneſs of the ſtalks of the leaves, by which a kind of ſuppoſitional ſtrength is preſerved. Theſe leaves are cut variouſly, as ſometimes with olive, parſley, or acanthus; but that the *carvers* are moſt expert at.

Plate F



F. Price delin.

Toms sculp.

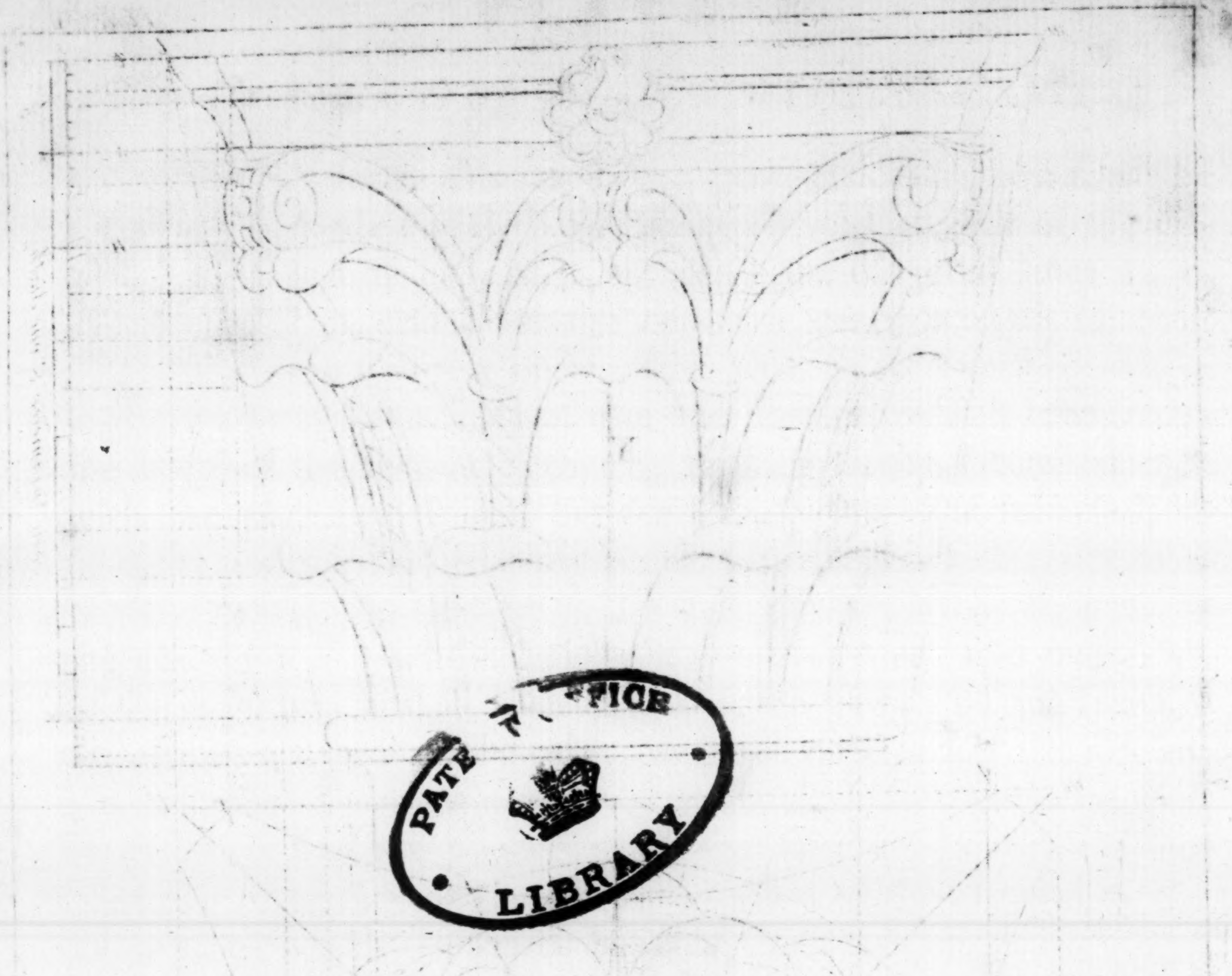


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Plate G.

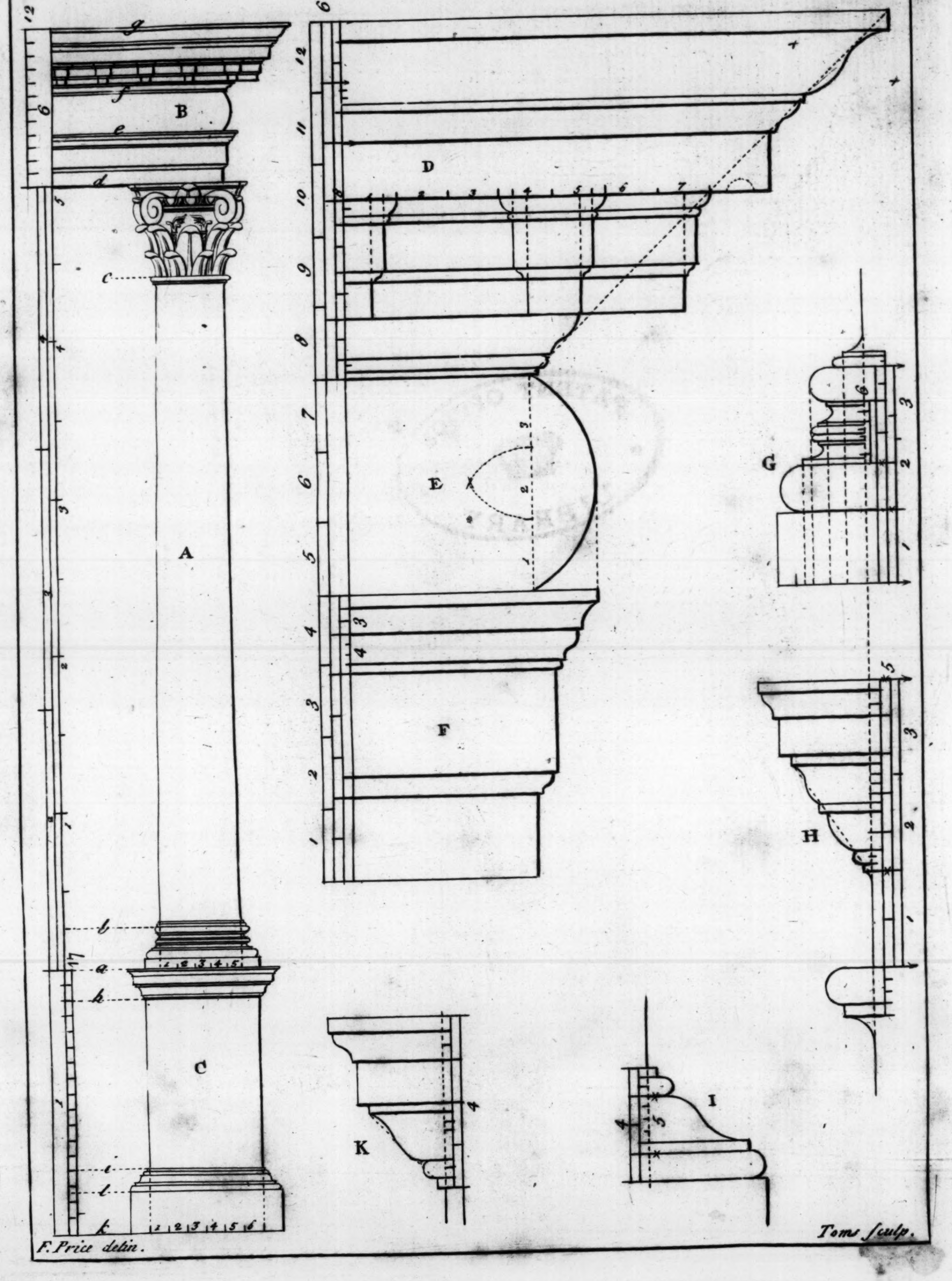

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PLATE G.

The Proportions of the COMPOSITE ORDER.

THE column A, is ten diameters high, including the baſe a, b, and capital c, d, each being as in the *Corinthian Order*. The entablature B, is one fifth part of the height of the column, as may appear by the ſcale; this height is divided into twelve parts, giving four to the architrave d, e, three to the freeze e, f, and five to the cornice f, g. The pedeſtal C, is one third of the height of the column, which being divided into ſeventeen parts, two is for the caping a, h, eleven for the die or naked h, i, and four for the baſe and plinth i, k, which being again divided into three parts, one is for the baſe i, l, and two for the plinth l, k; ſo that any height being given for this order, divide it into forty-ſix equal parts; three of which is the diameter of the column: From whence the other parts are proportioned.

The diameter of the column being divided into five parts, one is for the projecture of the baſe on each ſide; and which gives the breadth of the die, or trunk. The breadth of the pedeſtal being divided into ſix parts, one is for the projecture of the caping a, k, and baſe i, l, The capital c, d, is one diameter and one ſixth in height; and projects three-fourths of a diameter, from the central line; but as this capital requires an explanation by itſelf, as the foregoing *Ionick* and *Corinthian* capitals, therefore I ſhall paſs over it, to the architrave d, e, which projects equal to that of the freeze e, f, which is found as the *Ionick* freeze was, *viz.* by making an equilateral triangle of the middle part, its point being the center thereof. The cornice f, g, projects equal to its height.

The particular parts are enlarged, as in D, E, F, G, H, I, K, each of which I make no doubt but inſpection will explain; except it be the cornice, in which by drawing a line from the extream projection thereof, to the foot, moſt of the projections are ſhewn. From the central line of the column, to the projecture of the modilion, as limited by the ſaid line, divide into ſeven parts, two of which are for the length of the modilion, two for the ſpace betwixt each, and two for the largeſt projection, ſo that this modilion being a kind of architrave, the firſt *Facia* has one of theſe parts, and the ſecond *Facia* has one and an half.

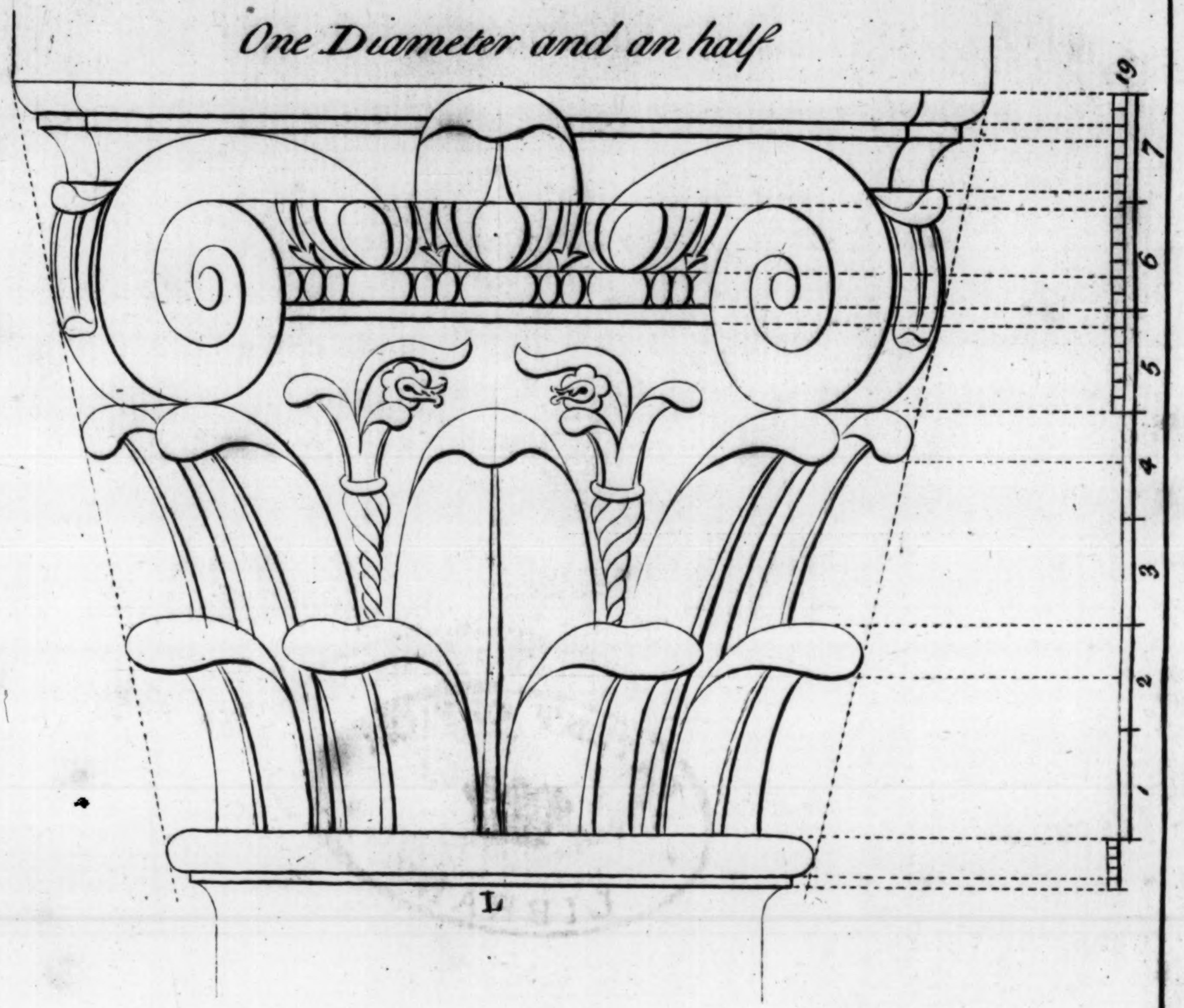
PLATE H.

The Proportions of the COMPOSITE CAPITAL, *together with the Intercolumniation proper to each Order.*

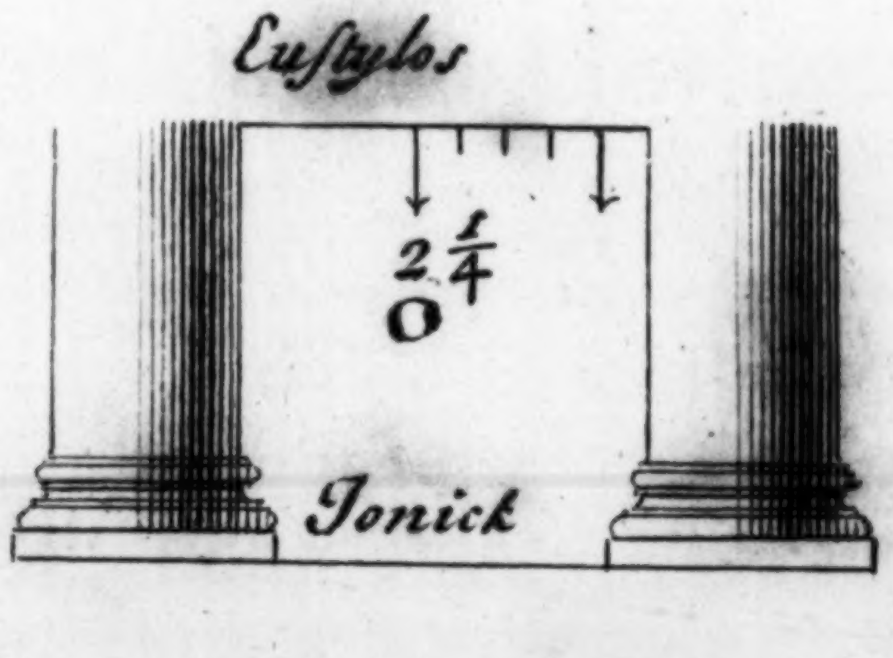
THIS capital is in height, one diameter and one ſixth, or it is equal to the height of the architrave and freeze together, the plan is the ſame as that of the *Corinthian*; the ſcale ſhews the height of each diſtinct part. This capital is compoſed of the *Ionick*, and *Corinthian* caps, as appears by the elevation L; the whole height being divided into ſeven parts, the upper three are the *Ionick* capital, differing in nothing but its plan, as will appear by compare. The lower four parts are for the two tire of leaves, taken from the *Corinthian* cap; for which reaſon 'tis call'd the *Compoſite Order*. As to the particulars, it comes ſo nearly alike to that of the *Corinthian*, that a farther explanation would be little elſe but repetition. Therefore in lieu, I ſhall mention the intercolumniation proper to each order. (That is, the ſpace betwixt one column and another if uſed in colonades.)

Palladio ſays, we muſt keep a due proportion and harmony between the intercolumniation, or ſpaces, and the columns. Becauſe if ſmall columns be made with large intercolumniations, it will very much leſſen their graceſulneſs. And on the contrary, if large columns have ſmall intercolumniations, the too little vacuity, will make them look without the leaſt grace. Therefore if the ſpaces be three diameters, the thickneſs of the column muſt be a ſeventh part of its altitude, as in the *Tuſcan Order*; which manner of placing columns is called *Areoſtylos*, as in M. But if the ſpace be two diameters, and two thirds, the length of the column ſhould be eight diameters, as in the *Dorick Order*; and this manner of placing columns, is called *Dyaſtylos*, as in N. If two and a quarter, the column muſt be nine diameters in length, as in the *Ionick Order*; and this manner is called *Euſtylos*, as in O. And if no more than two, the columns muſt be nine diameters and an half high, as in the *Corinthian Order*; which manner is called *Syſtylos*, as in P. And *laſtly*, If of one diameter and an half, the length of the column ſhould be ten diameters, as in the *Compoſite Order*; and this manner of placing columns is called *Pycnoſtylos*, as in Q. I have been thus free, *ſays he*, in making my obſervations, to the end that they may ſerve as examples.

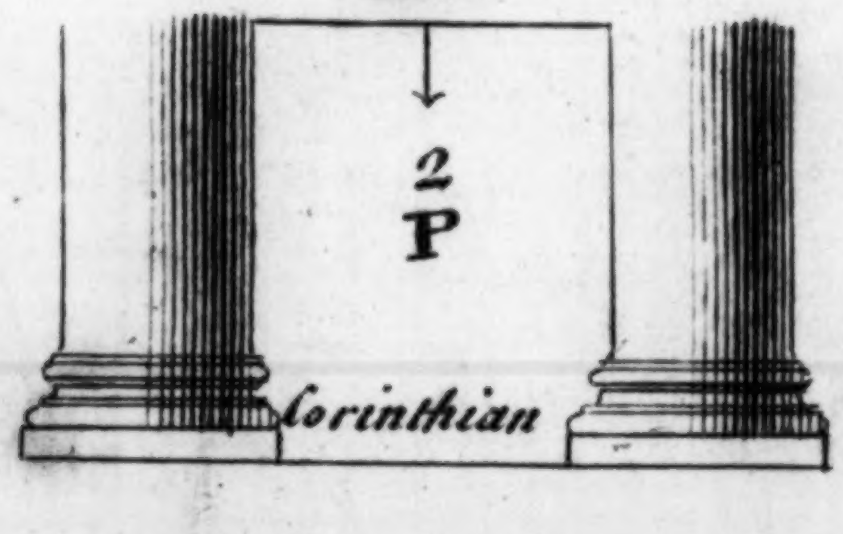
Plate H.



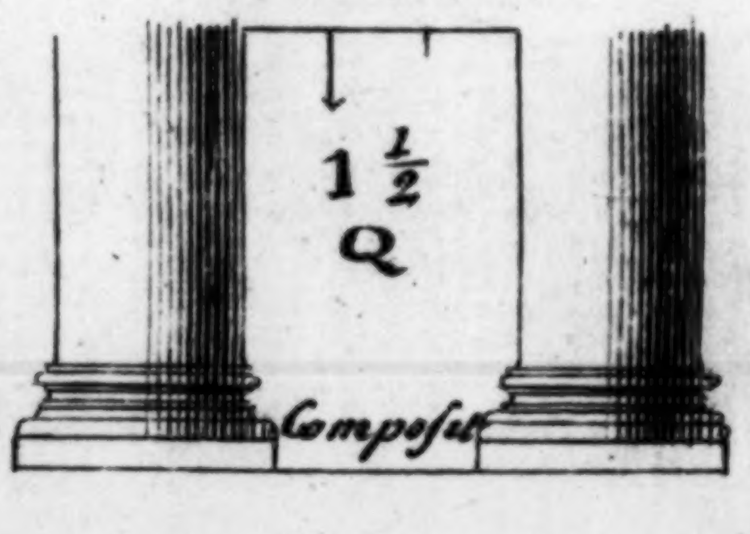
Euſtylos



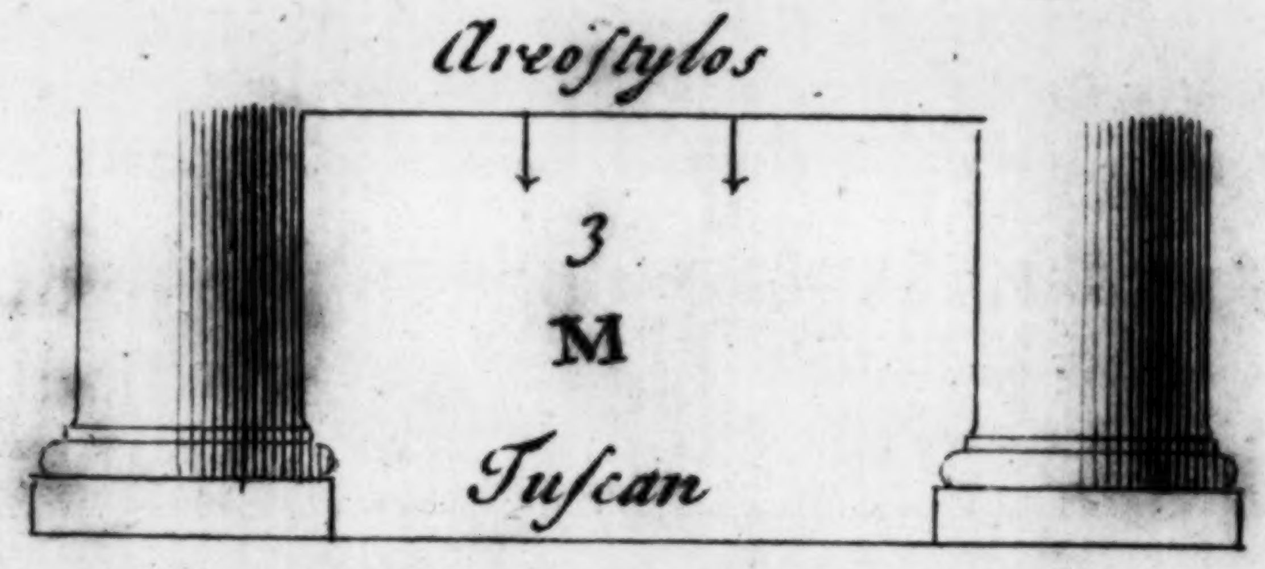
Syſtylos



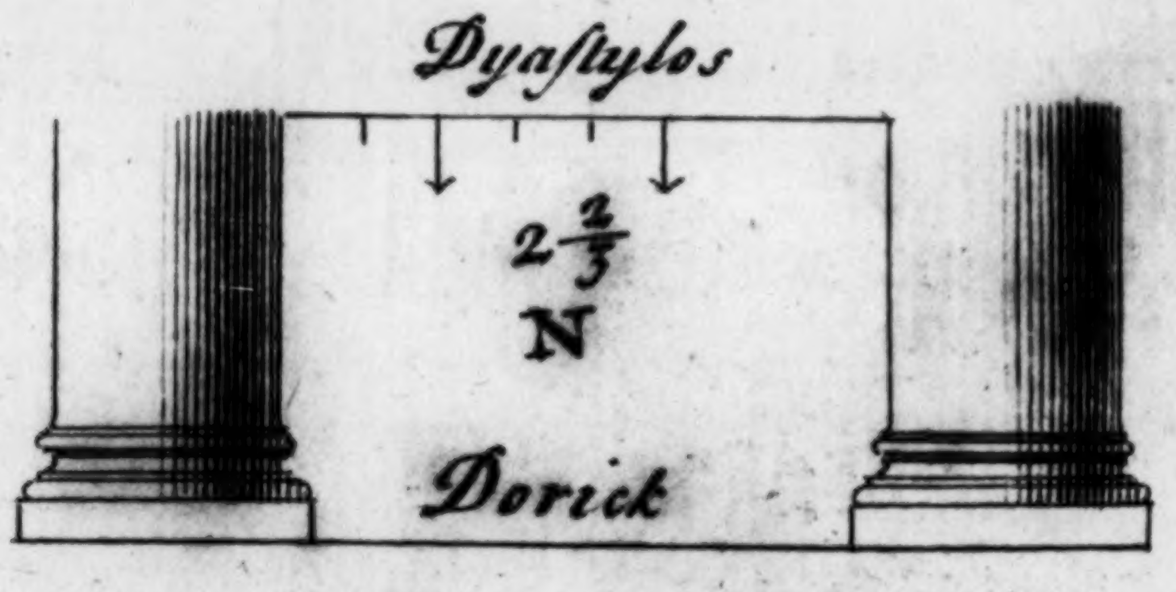
Pycnoſtylos



Areoſtylos



Dyaſtylos



F. Price delin. Toms sculp.

Plate I

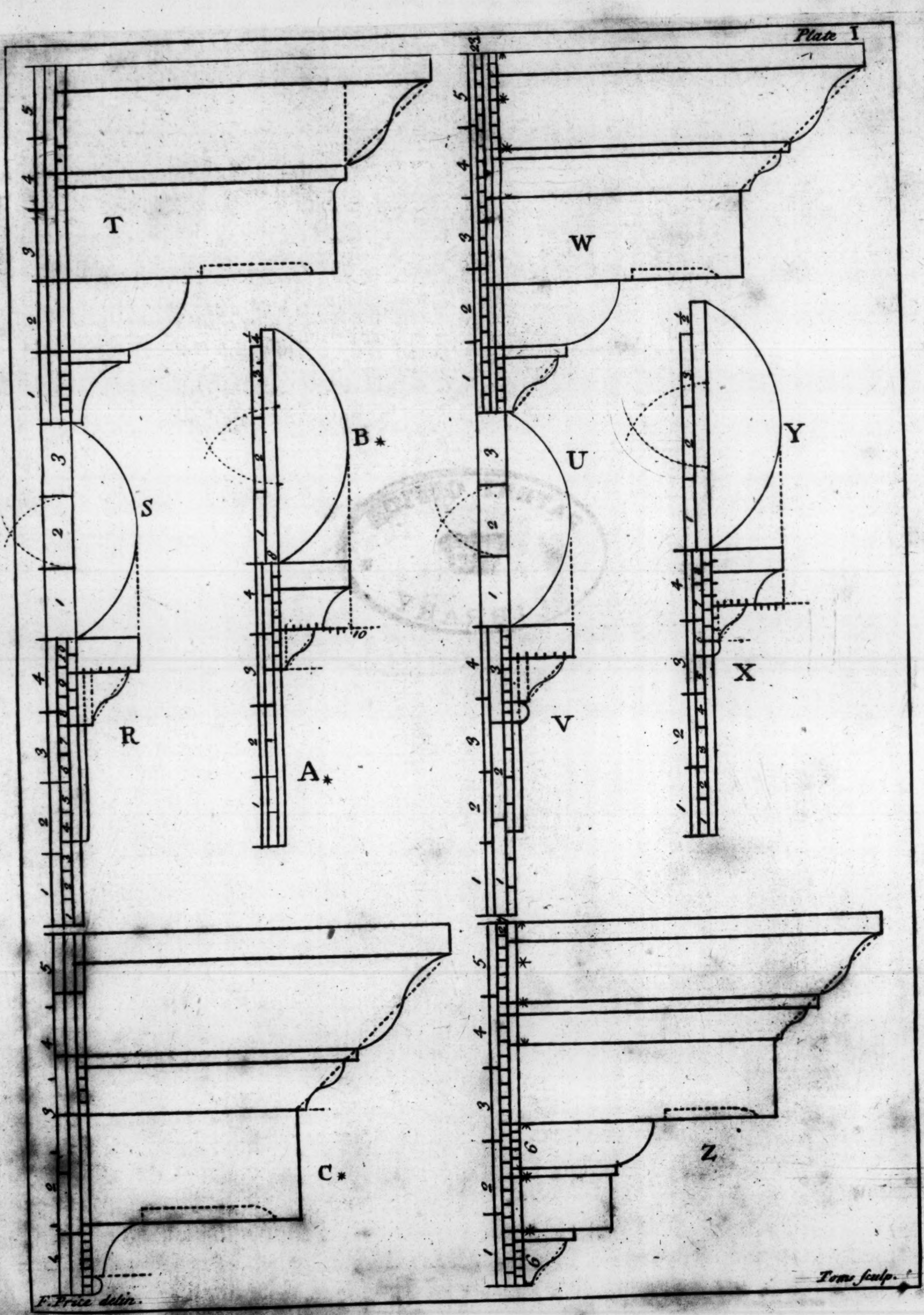


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PLATE I.

The Proportions of the Ornaments of DOORS, WINDOWS, &c.

THE width of either being given, make its height equal to two diameters; or two diameters and a ſixth part: Which is eſteemed as the beſt proportion. The ſaid width being made as the uſe and conveniency of the place allows, (of which more will be obſerved in its due place,) divide it into ſix equal parts, one of which is for the architrave as in R; which being divided into four equal parts, three give the height of the freeze S; and five ſuch parts give the height of the cornice T; all which is eaſily conceived by the ſcale, therefore to my thinking can want no explanation, otherways than due inſpection.

Again, admit that of V, was an architrave proportioned as before. U, being the freeze, and W, the cornice, the method is as before, (the Ornaments only varying;) theſe members will be eaſily conceived, by duly inſpecting the ſcales; and as to the curves of each moulding, enough ſeems to have been ſhewn in the foregoing Plates.

N. B. *The firſt face of the architrave ſhould be as far from the frame of the door, or window, as the breadth of the whole architrave; obſerve alſo that this proportion is taken from the width between one architrave and the other, as will be ſhewn in its due place.*

Admit the architrave X, were one ſixth part of the opening; which being divided into four parts, as before, the freeze Y, has three ſuch parts, and an half, as appears by the ſcale; and the cornice Z, has five parts as in the other examples. Each of theſe cornices projects equal to their height; and the freeze in all being formed by an equilateral triangle, made with one third part thereof, gives the projection of the architrave; whoſe parts are ſhewn diſtinctly, by the ſcales.

The architrave A*, being one ſixth part of the opening, is divided into four parts; of which, the freeze B*, has three and one fourth; and cornice C*, has five ſuch parts. So that here are four manners, of forming the ornaments of *doors* and *windows* according to PALLADIO.

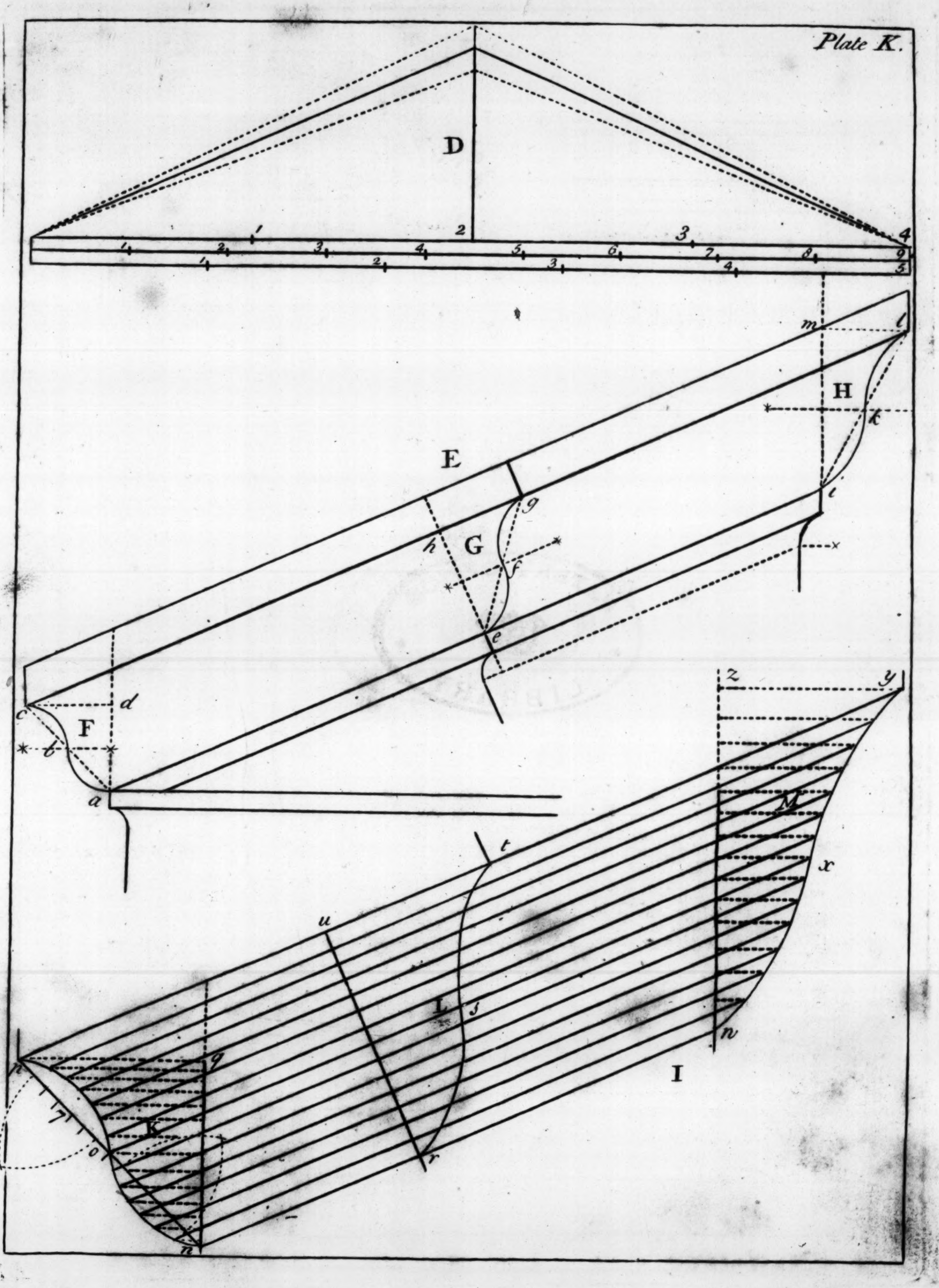
PLATE K.

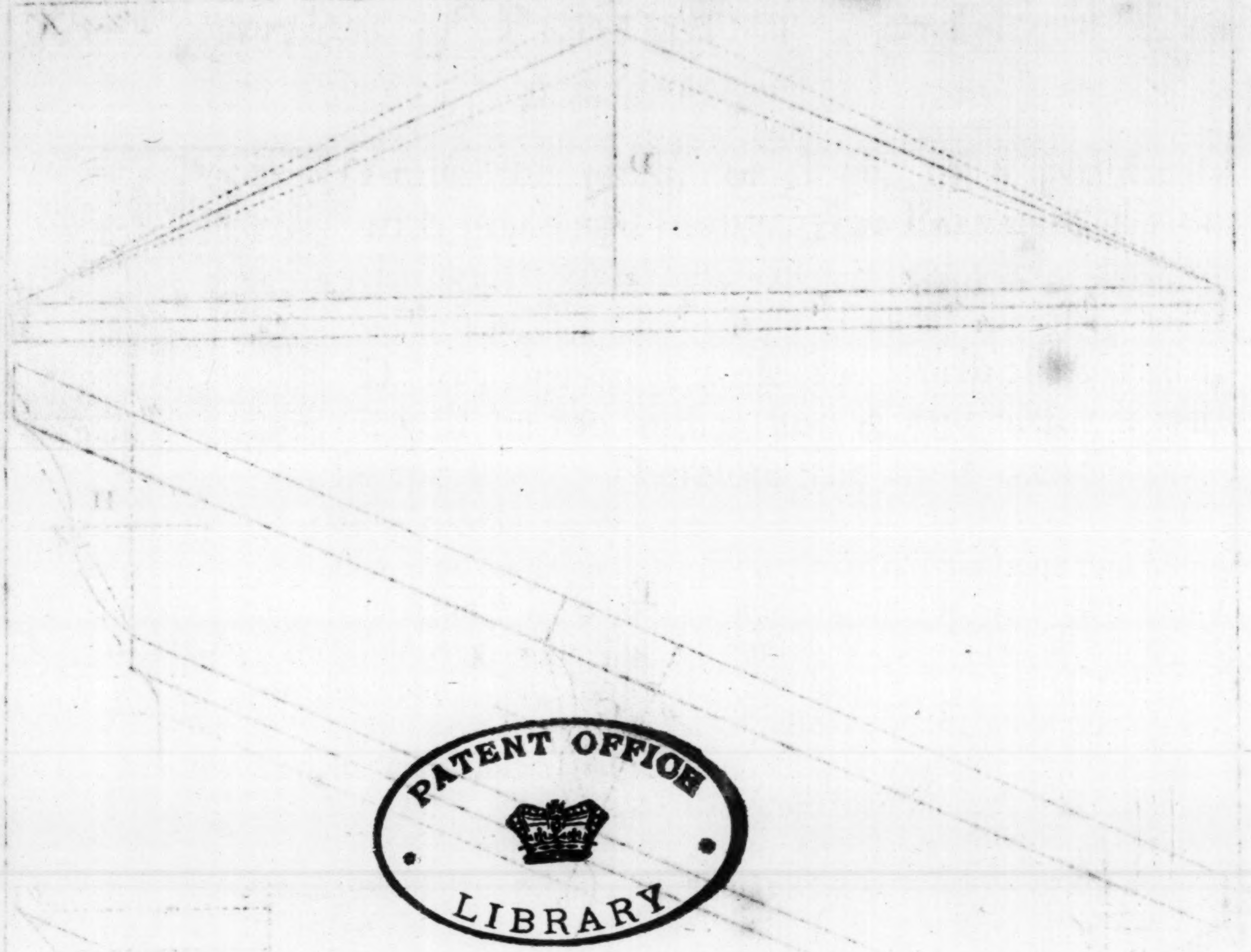
The Proportions of PEDIMENTS, *and their Dependants.*

TO raiſe the pitch, or ſlope, of a pediment, with grace and beauty, *ſays* PALLADIO, divide the width given into nine equal parts, two of which will be its perpendicular height, as in D; for, *ſays he*, if it riſe one fourth of its width, it will be too high; and if one fifth, it will be too low. Therefore the moſt comely proportion, will be two ninths as before.

And in conſideration that no pediment can be perform'd without two kinds of cornice, (except it be knee'd at its bottom or ſpringing, which is reckoned a kind of defect,) therefore to give each of the cymas ſuch a ſhape, or curve, as ſhall ſtrictly agree in their miter, do thus. Deſcribe the curve of the level cornice F, as a, b, c, by two ſuch portions of circles, as that the centers for forming each may be on an horizontal, or level line, drawn through the middle of the ſaid cyma; as ** c, d; being the projecture thereof. Draw lines from the points of the ſaid cyma, agreeable to the ſlope of the pediment, which gives or terminates the bigneſs of the raking cornice or cyma G; ſo that by drawing a line through the middle of the ſaid member, on it are the centers **, by which the curves e, f, g, are deſcribed; the projecture g, h, being as before. In caſe a break or return be made in the pediment, then another kind of cyma muſt be formed, which ſhall agree with the two former, as H; the centers for forming each curve, being on an horizontal line drawn through the middle of the cyma, as before; i, k, l, is the curve whoſe projecture as before is l, m; theſe three kinds of cornices being thus formed, will agree with each other, without the trouble of tracing. *But if the given curve, be not deſcribed as before, then obſerve the method propoſed in I; by which the curve of any raking moulding whatever, may truly be deſcribed.* Admit the cornice given were K; n, o, p, being its curve, and p, q, its projecture; by making points on the ſaid curve, draw lines from them, agreeable to the ſlope of the pediment, on which place each reſpective projecture from K, to L, ſo is r, s, t, its curve, the projecture being t, u, as before. And if a break or return be made as M, then transfer the ſeveral projectures from K, obſerving that the points be on the lines drawn agreeable to the rake of the pediment, ſo will w, x, y, be the curve, and y, z, the projecture as before; which no doubt but inſpection explains.

Plate K.




A
D
H
I

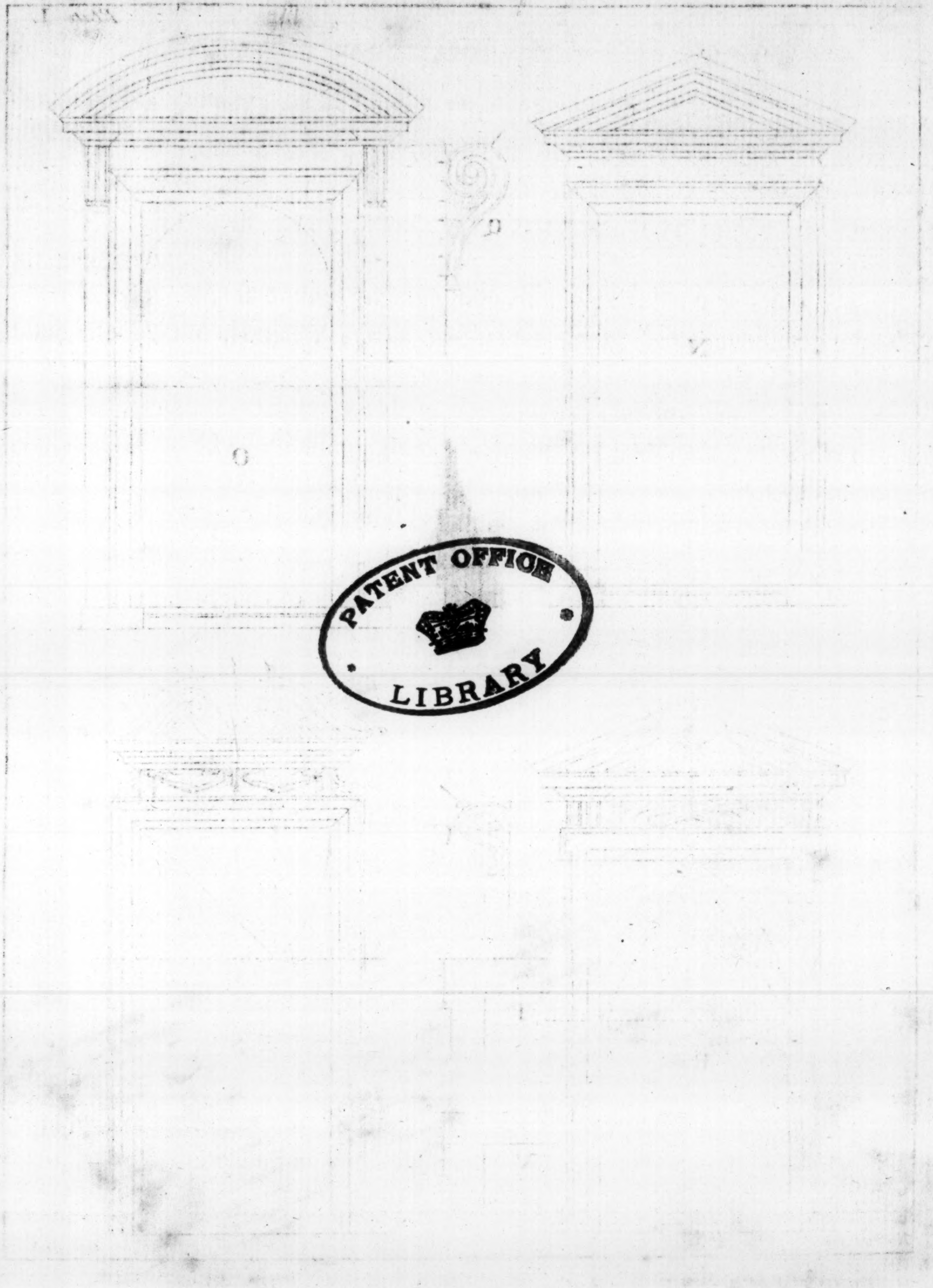


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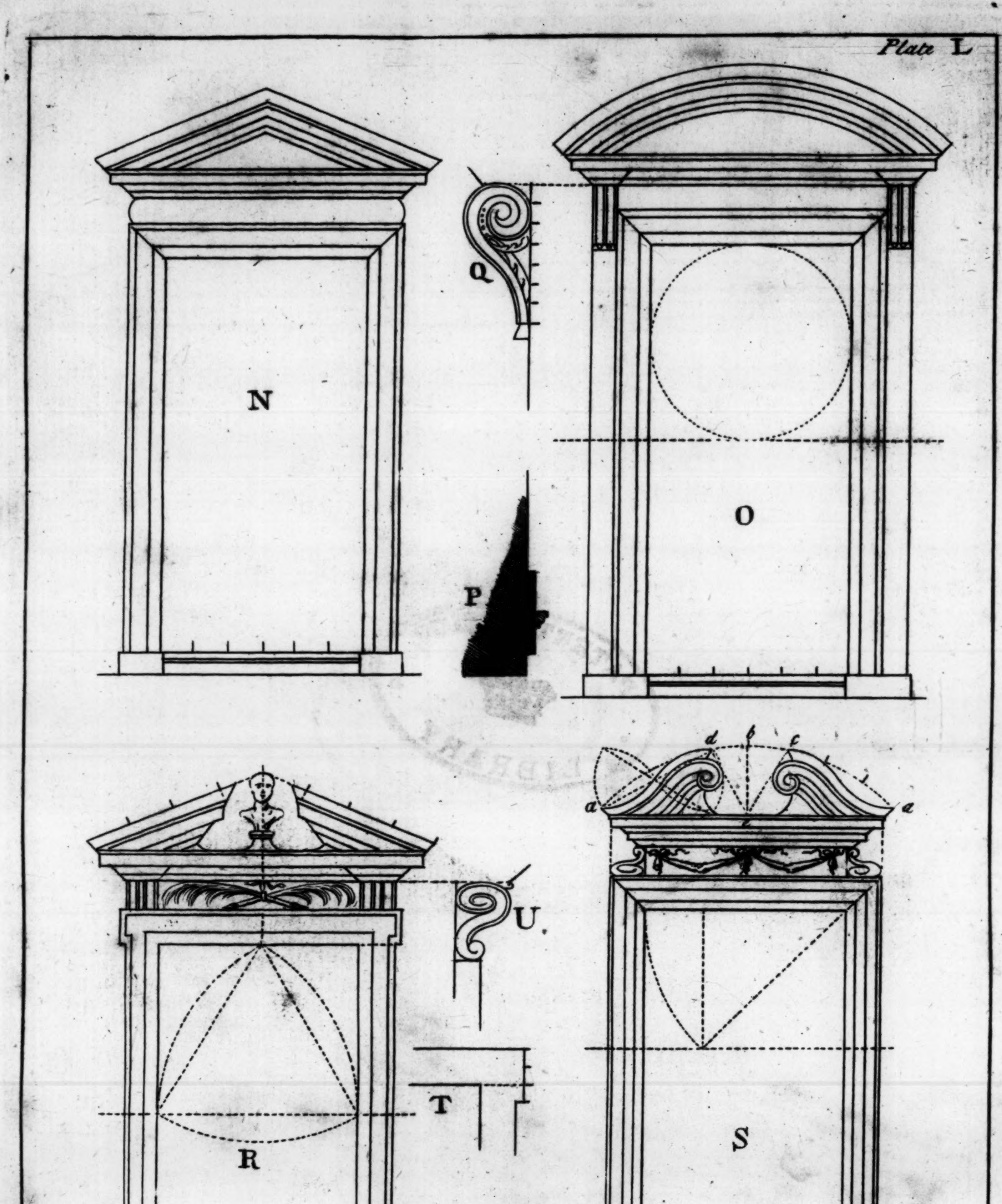
Plate L



F. Price delin

Toms sculp

PLATE L.

The foregoing Proportions apply'd to PRACTICE.

HAVING mentioned the various ornaments proper to adorn *doors* and *windows* in the foregoing PLATE, *viz.* the architrave, freeze and cornice; as alſo the pitch of pediments, *&c.* it remains to apply the ſame to practice.

That of N, is a *door* or *window* of two diameters high; and that of O, two diameters and one ſixth part: The architrave being divided into three parts, two is for the breadth of the pilaſter, as in P; on theſe pilaſters are placed the truſſes, ſcroles, or corbels, as in Q; whoſe ſhape is almoſt at pleaſure; if either of theſe are uſed as frontiſpieces of external doors, the pediment ought not to be broken, or opened, and the architrave ſhould ſtand on a plinth, equal to two thirds thereof, or to the height of the ſtep, by which one aſcends into the houſe, *&c.* but if uſed in the internal part, the architrave may come down to the floor or pavement, and the pediment may be opened as in R; the knee, or break of the architrave is one fourth of the width thereof, its length being equal to the whole breadth of the architrave, as in R, or to one diameter and an half as in T, or two diameters as in V; at pleaſure. In this freeze are placed truſſes, whoſe form is U, which brings the pediment forward to receive the buſto; as to the opening, inſpection will explain it. This door is two diameters high, and that of S, is two diameters and one ſixth, and has its freeze contracted. The pediment is opened to receive a ſhield, *&c.* and as to the other particulars, (that is, the diſtinct members,) enough has been ſhewn in the foregoing PLATE.

Either of theſe may ſerve as a chimney-piece, by changing the proportion of their height only; for inſtance, admit the height were equal to its width, as in O; or by deſcribing an equilateral triangle, whoſe ſides are equal to the width, as in R; or *laſtly*, by the diagonal of a ſquare, as in S; all which have a pleaſing effect, The pediment is proportion'd by making a quarter-circle, as a, b, a, which being divided into eight parts, three are for the parts of the pediment on each ſide, and two for the opening c, d, ſ, that by drawing the line c, e, or d, e, the projecture of the ſcroles are terminated, the reſt may appear by inſpection.

PLATE M.

A Regular Proportion for the ſeveral PEDESTALS.

HAVING delivered the Proportions of the five Orders, together with the Ornaments of Doors, Windows, *&c. according to* PALLADIO; *I hope 'twill not diſpleaſe any, that I take the liberty to inſert ſuch Obſervations as naturally occur'd from going through ſuch a task.*

PALLADIO proportions the *Dorick* pedeſtal, by making its die a perfect ſquare, as W, equal to the breadth of the plinth of the column, which bigneſs is found by dividing the body, or diameter of the column, into ſix parts, of which one is for the projecture of the ſaid plinth on each ſide, and by being divided into four equal parts, one is for the caping, and two for the baſe and plinth, which being divided into three, one is for the baſe, and two for the plinth, as appears by the ſcale.

N. B. *This is the ſame proportion as was before delivered.*

The *Ionick* pedeſtal, is proportion'd by making its die a ſquare and one ſixth, as X, which being divided into four parts and an half, i, e, nine parts; two is for the caping, and four for the baſe and plinth, as before.

The *Compoſite* pedeſtal, is proportion'd by making its die a ſquare and two ſixths, as Z, which being divided into ten parts, two is for its caping, and four for the baſe and plinth, as before.

The *Corinthian* pedeſtal, is proportion'd by making its die a ſquare and three ſixths, as Y, i, e, a ſquare and an half; (the bigneſs of which is found, by dividing the diameter of the column into five parts, one is for the projecture of the ſaid plinth on each ſide,) which being divided into eleven parts, two is for the caping, and four for the baſe and plinth.

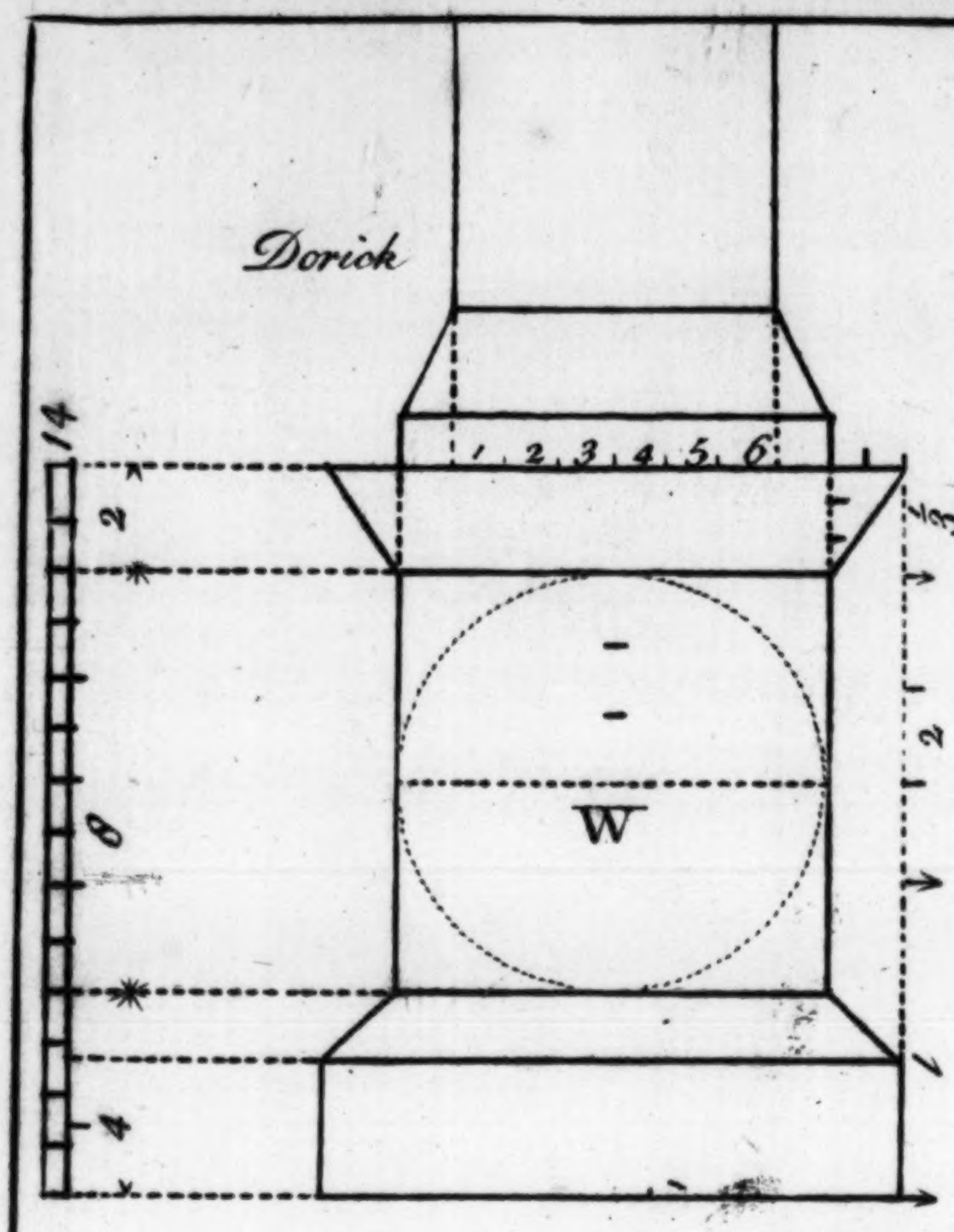
N. B. *This is alſo the ſame proportion as was before deliver'd.*

By this method, the pedeſtals riſe one above the other by a regular proportion, *viz.* The *Dorick* is two diameters, and one third of the column, the *Ionick* is two diameters and two thirds, the *Compoſite* is three diameters, and the *Corinthian* is three diameters and one third. As to the proportion of the ſmall members, 'twas ſufficiently explained before, therefore needs not be repeated.

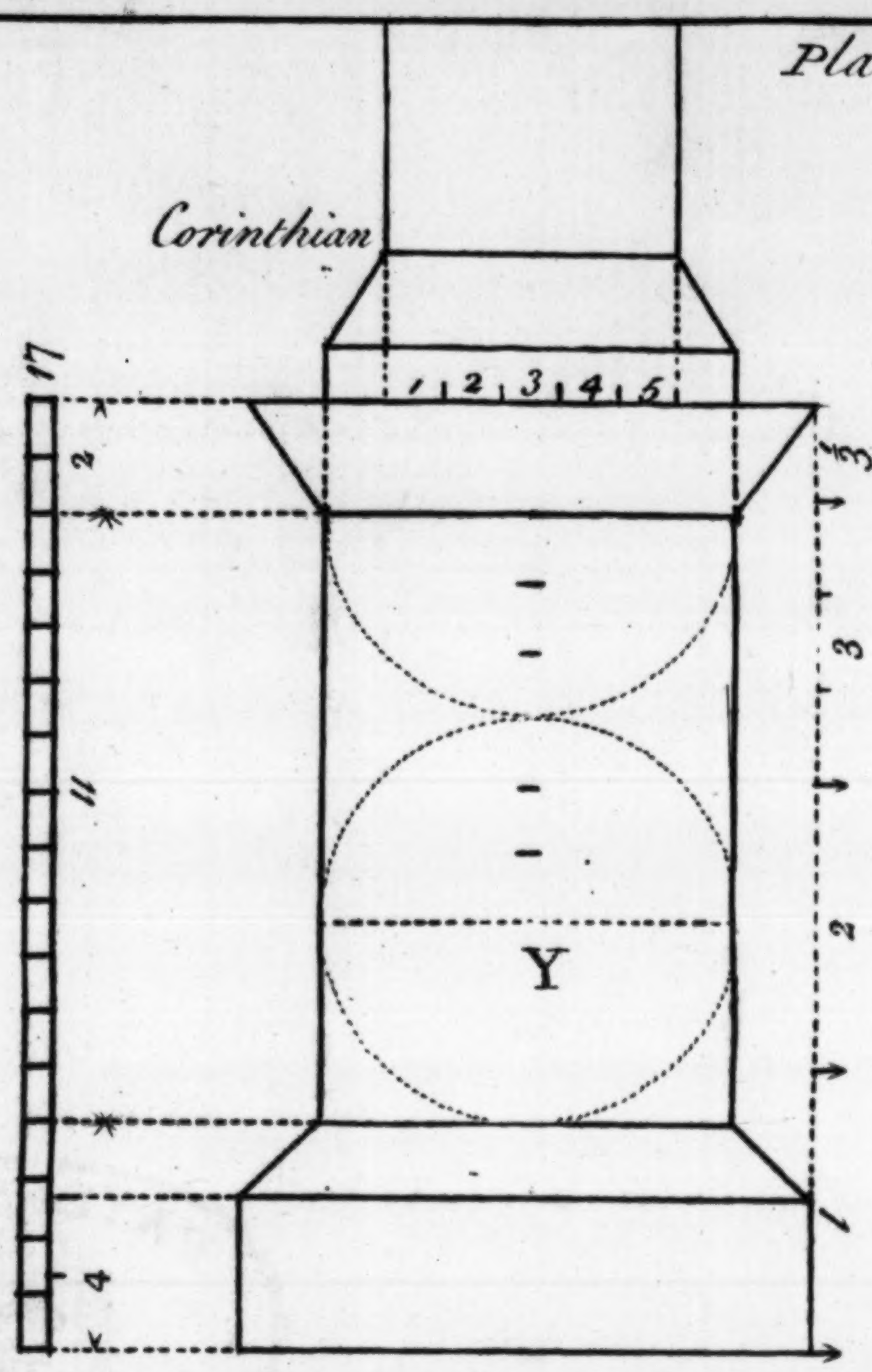
Note, The *Ionick* and *Compoſite* plinths, are found by dividing the difference between that of the *Dorick,* and that of the *Corinthian,* into three parts, giving one to the augmentation of each plinth.

Plate M.

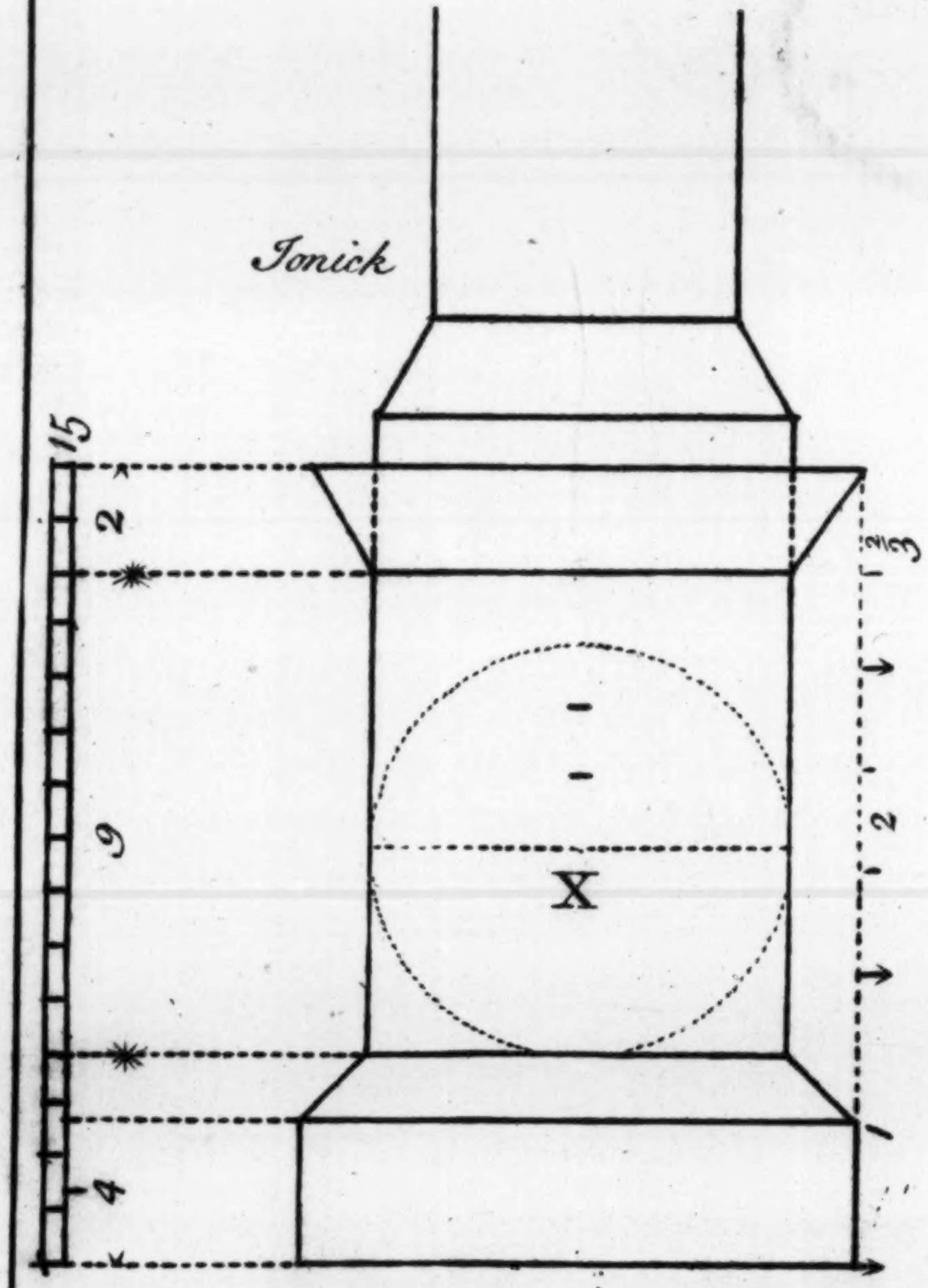
Dorick



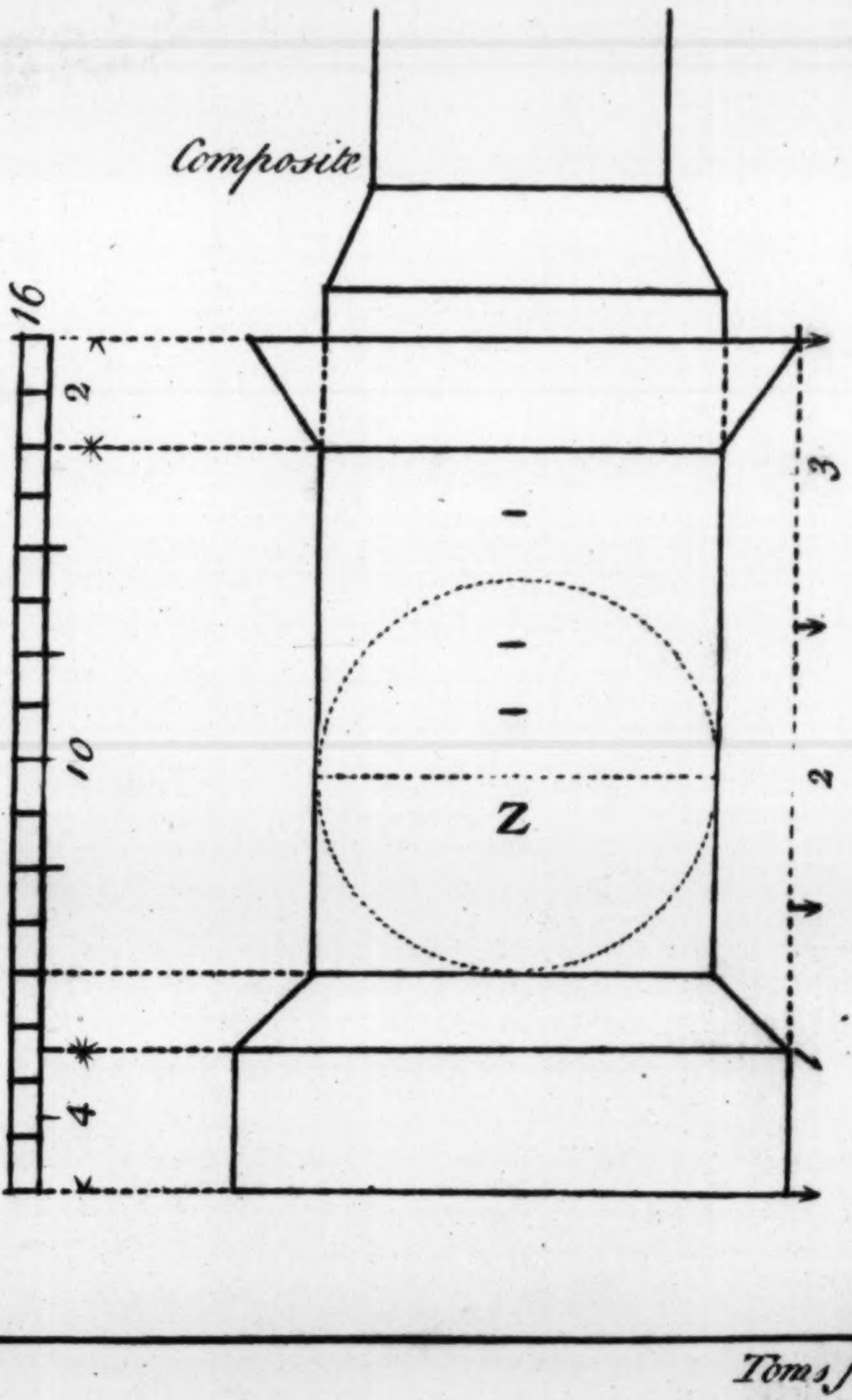
Corinthian



Ionick



Composite



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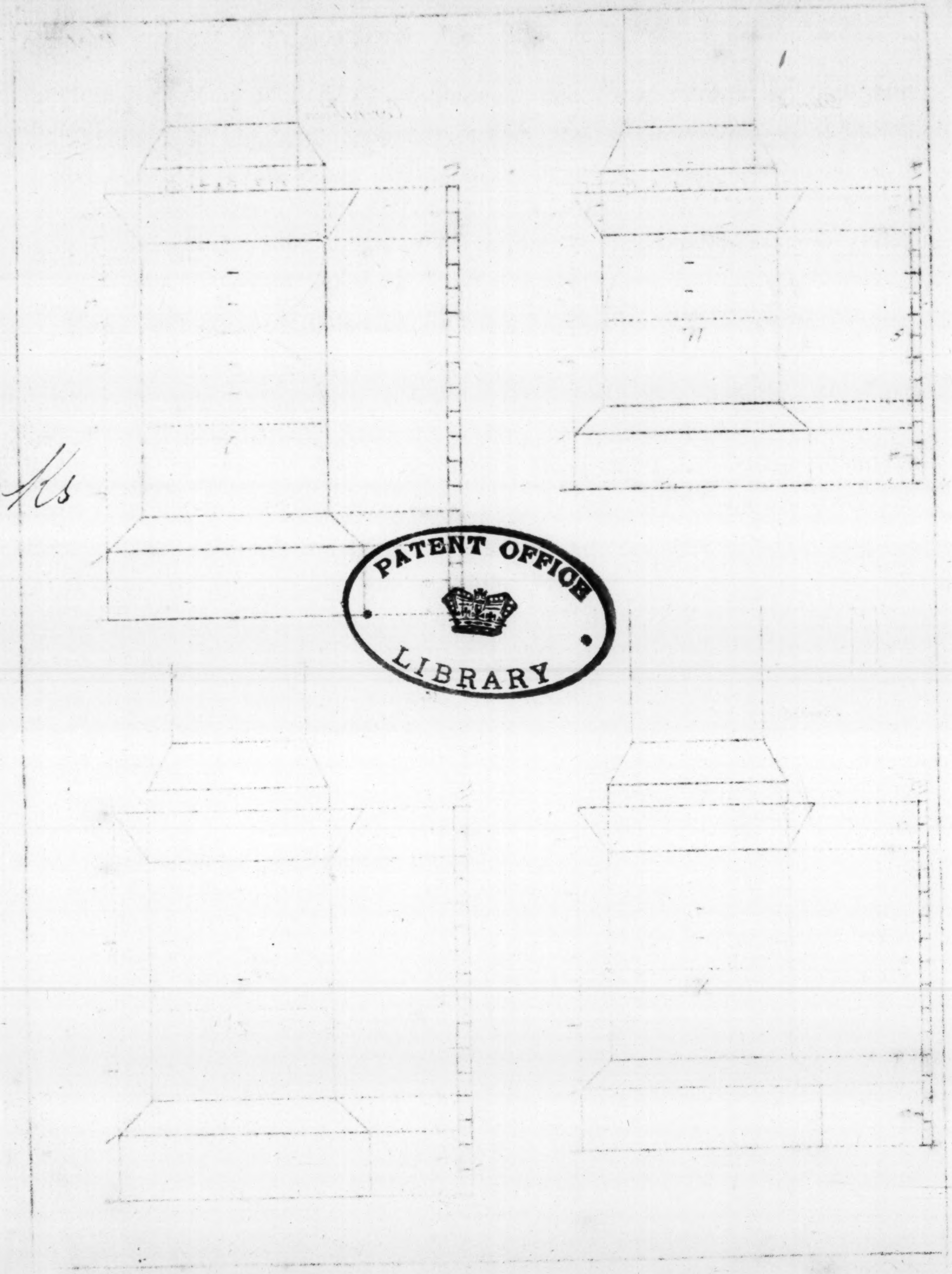
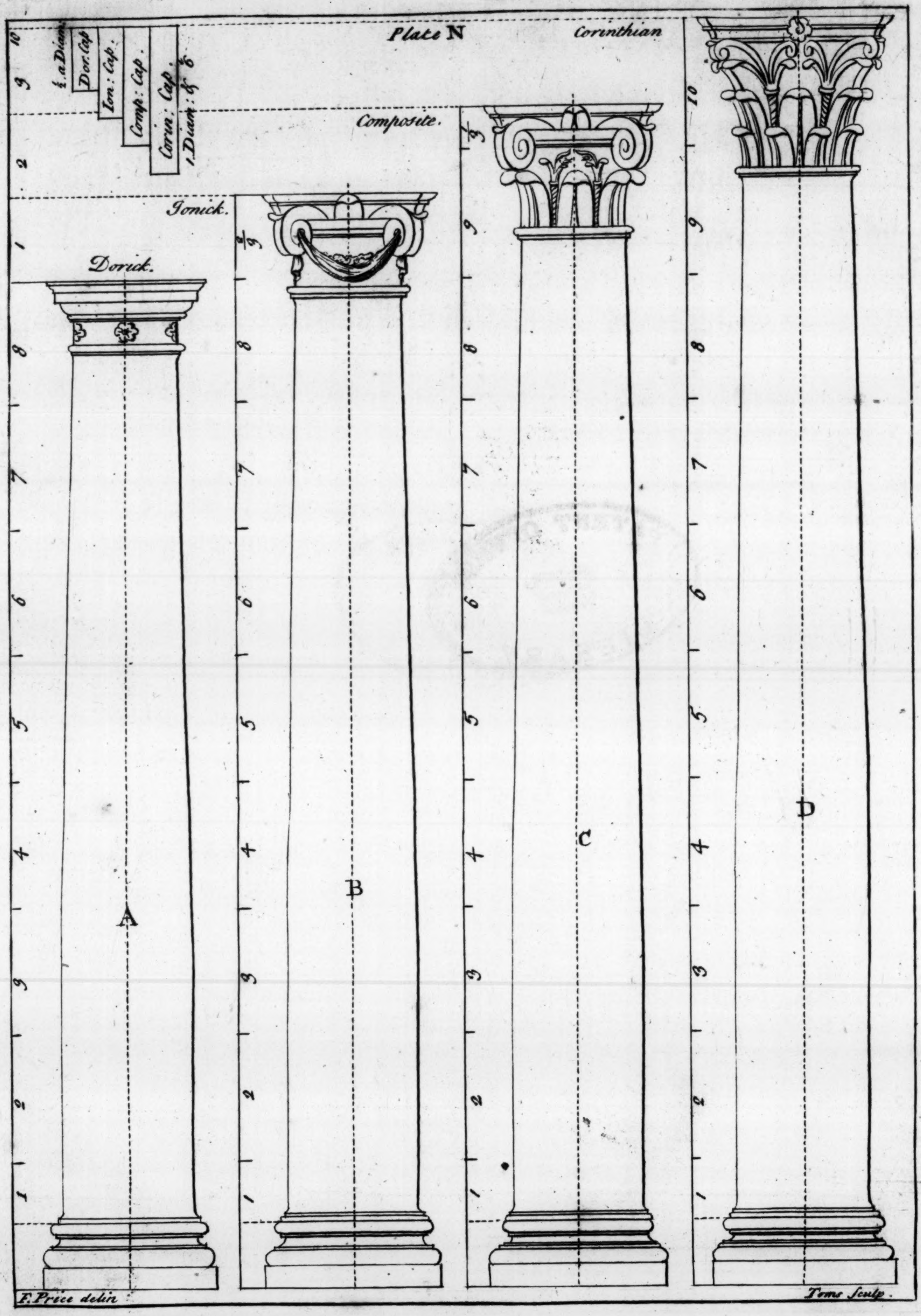


J. Hooks

Plate N



F. Price delin

Toms Sculp.

A Regular Proportion for the ſeveral COLUMNS *and* CAPITALS.

I MAKE the *Dorick* and *Corinthian* my ſtandards, as before. The *Dorick* column A, together with its baſe and capital; (each being half the diameter of the column,) is eight diameters high. And the *Corinthian* column D, together with its baſe and capital, is ten diameters high. The baſe being half a diameter in height, and the capital one diameter and one ſixth; ſo that by dividing the difference betwixt the height of theſe columns (being two diameters,) into three equal parts, one is given to the augmentation of each column: By which means the *Ionick* column B, together with its baſe and capital, is eight diameters and two thirds high. And the *Compoſite* column C, including its baſe and capital is nine diameters and one third in height: So that the columns riſe in height, proportionable to one another.

Note, The *Dorick* capital is half a diameter high, and the *Corinthian* capital is one diameter and one ſixth. Therefore I divide the difference into three equal parts, as above; giving one part to the additional height of each capital; all which the ſcales ſo plainly ſhew, that a farther explanation is needleſs. The *Ionick* capital is diverted by feſtoons of drapery, which go through its volutes, and which, as occaſion ſhall direct, may be of fruit, flowers, *&c.* There are abundance of examples of this kind of *Ionick* capital, to be found in the productions of the antients, and alſo in the works of Sir *Chriſtopher Wren*; particularly in the front of St. *Magnus*'s church, at the foot of *London* bridge. The *Compoſite* capital, is diverted by the volutes of the *Ionick*, and leaves of the *Corinthian*. And of this kind of capital, alſo abundance of examples might be produced in the works of Sir *Chriſtopher Wren*. At the ſame time it is ſo agreeable to the words of moſt able writers on this ſubject, that it will need no enforcing.

N. B. By making the capitals in this proportion, the ſhafts of the columns will be agreeable in height to one another, ſo that the whole riſes progreſſively, which point has not been regarded hitherto, although a very material one.

A Regular Proportion for the ſeveral Entablatures, together with the Conſtruction of the Orders.

HAVING adjuſted the ſeveral pedeſtals, columns, and capitals, it remains that ſomething ſhould be ſaid of the entablatures, which will be thus, *viz.* PALLADIO obſerves in words, that the *Dorick* entablature E, ſhould be one fourth of the height of the column, (but does not verify the ſame by example,) and the *Corinthian* O, one fifth; which I ſhall otherways call $\frac{3}{12}$ths and $\frac{3}{15}$ths, ſo that the *Ionick* entablature H, is $\frac{3}{13}$ths, and the *Compoſite* L, $\frac{3}{14}$ths, which may better appear by inſpecting the PLATE; at which time may be obſerved, that each entablature is two diameters of the column; and for the particular proportion of the ſeveral members, enough ſeems to have been ſhewn in the foregoing examples; except it be in the *Dorick* entablature E, (which was there ſhewn, at the proportion of two ninths of the height of the column,) which was divided into fifteen parts; therefore as this is one fourth of the height of the column, it muſt be divided into ſixteen parts, of which ſix is for the cornice, the other parts are as before, except its projecture.

That theſe proportions are applicable to uſe, may thus appear; any height being given for an entire *Dorick* order, divide it into thirty-ſeven parts; of which, ſeven is for the pedeſtal G, twenty-four for the column F, and ſix for the entablature E; ſo that the confinement being for any part, the ſame ſcale gives the proportions.

Note, Three ſuch parts is the diameter of the column.

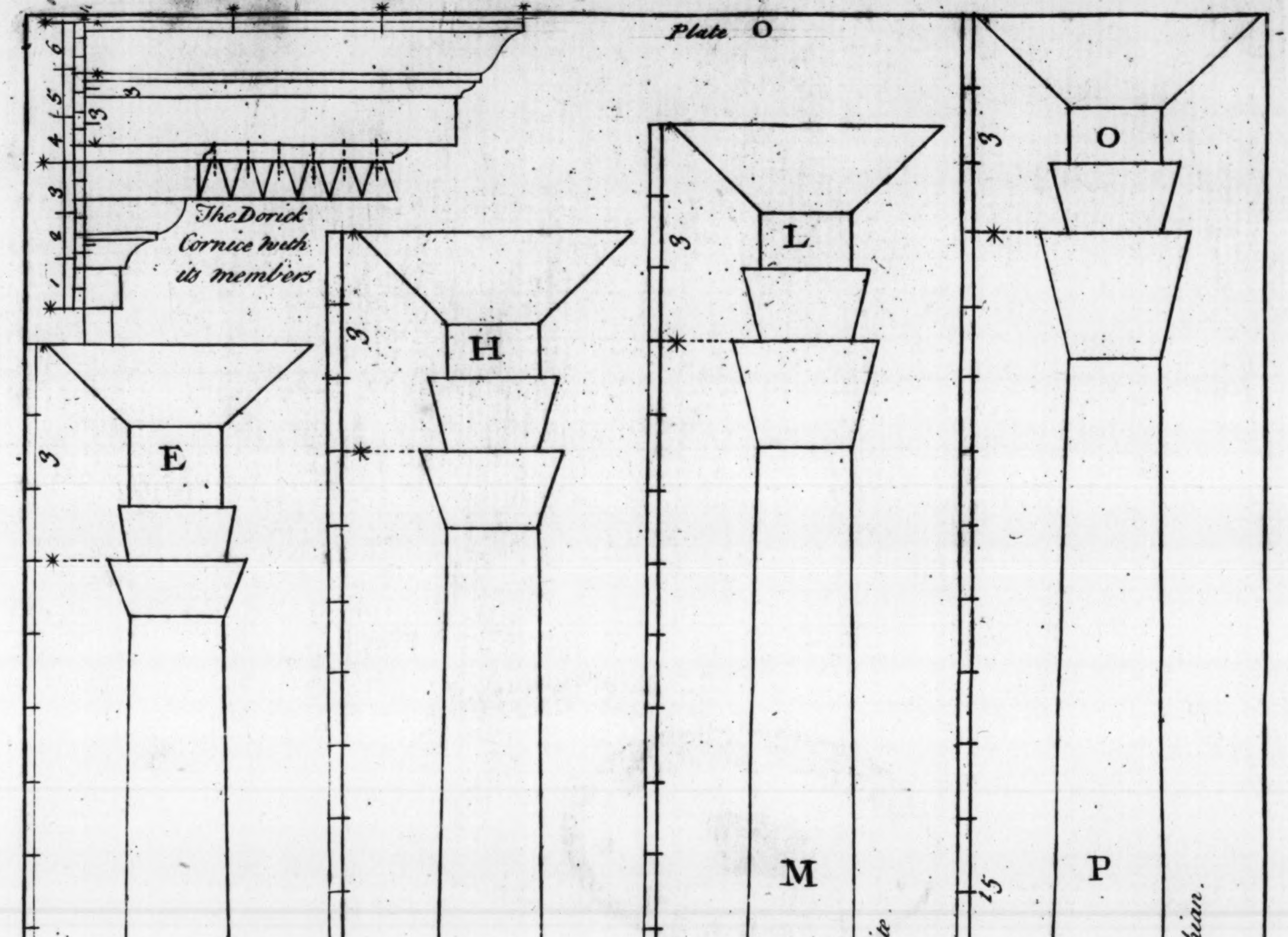
Admit a given height was for the *Ionick* order entire, divide it into forty equal parts; of which eight is for the pedeſtal K, twenty-ſix for the column I, and ſix for the entablature H.

Again, Let any height be given for the *Compoſite* order, divide it into forty-three equal parts; of which nine is for the pedeſtal N, twenty-eight for the column M, and ſix for the entablature L.

Laſtly, Admit a height were given for the *Corinthian* order, divide it into forty-ſix equal parts, ten are for the height of the pedeſtal Q, thirty for the height of the column P, and ſix for the entablature O; ſo that if the foregoing method be thought tedious, this may ſupply its place, by being more expeditious, as well as eaſier to be conceived.

Note, The Particulars may be eaſily conceived, by peruſing the foregoing PLATES, and paragraphs.

Plate O



F. Price delin.

Toms sculp.

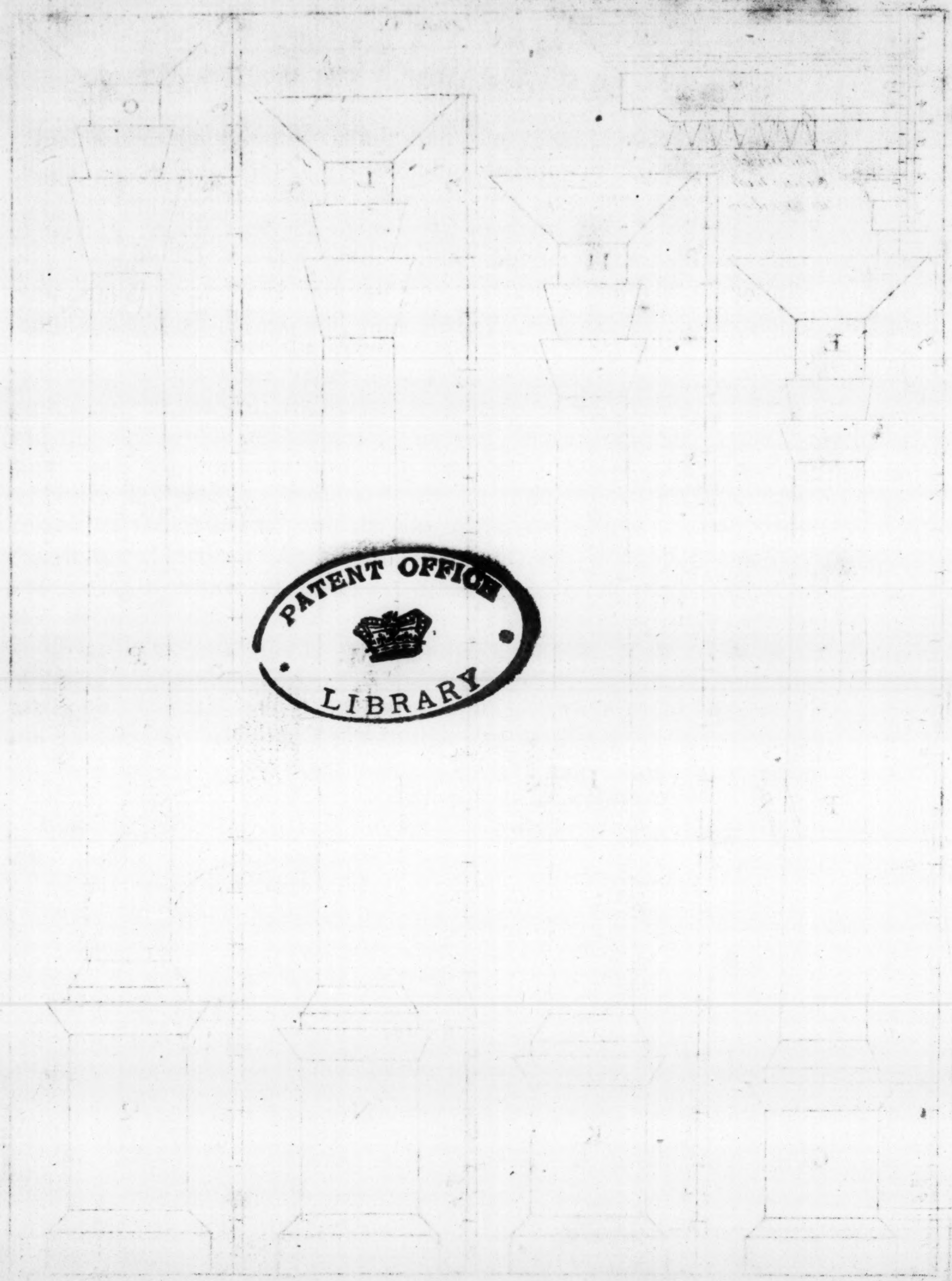

O
I
H

Plate P.

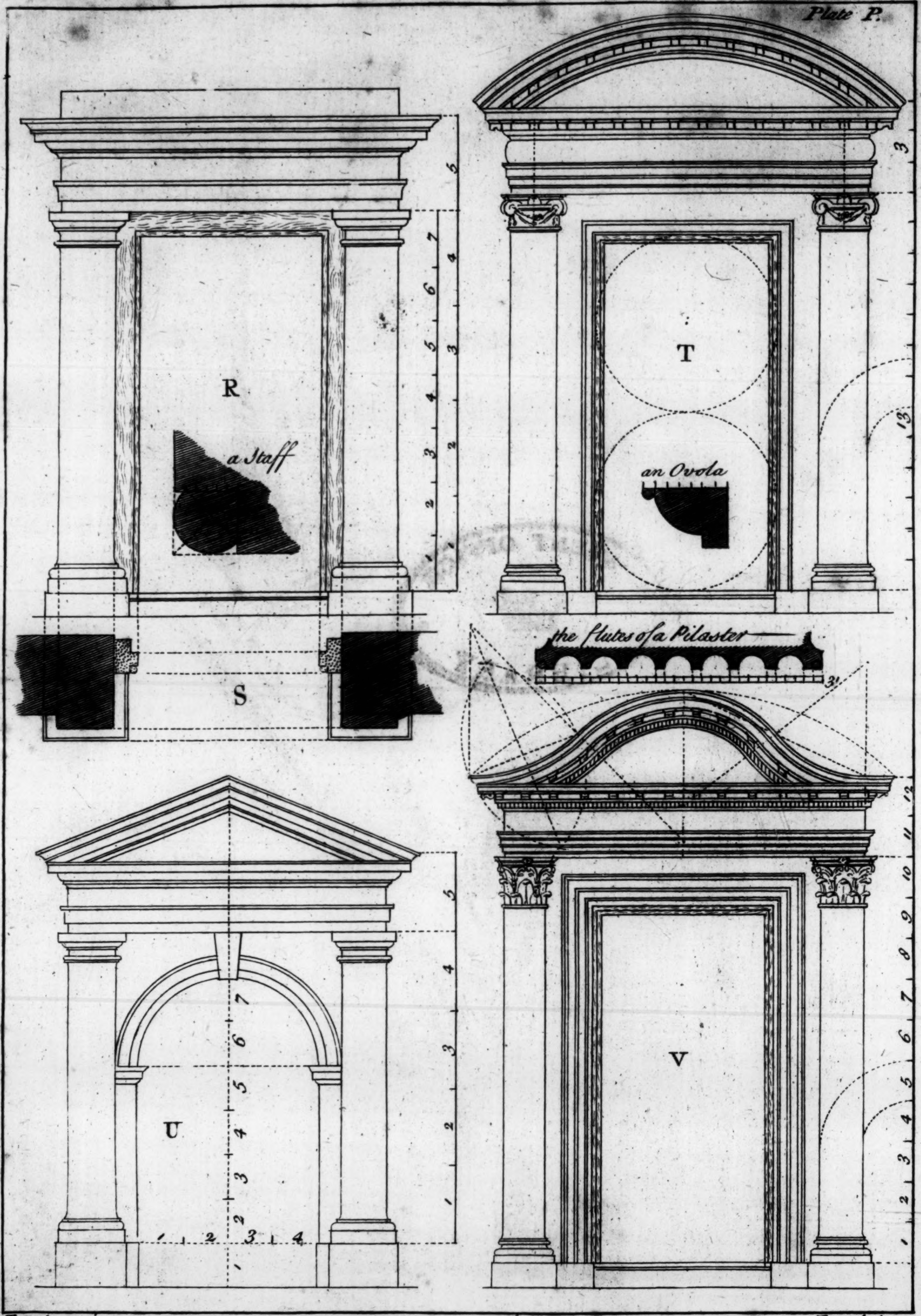


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PLATE P.

The foregoing Proportions apply'd to Practice in the Decoration of Doors, &c.

THE door R, is adorned in a plain manner, with *Tuſcan* pilaſters, which ſtand on a plinth, equal in height to the ſtep by which one aſcends into the building. The opening of the door frame is of two diameters in height, ſo that by determining how much of the ſaid frame ſhall be ſeen, (*viz.* as much as will take the projecture of the baſe, and capital of the pilaſters;) which ſhews the height of the pilaſters, as appears by inſpection; theſe pilaſters ſhew one fourth part of their diameter outwads, and their whole breadth inwards, as appears by the plan S.

Note, By placing the door frame ſo far within the face of the wall, the door is the better ſheltered.

The door T, is adorned in a more beautiful manner, with *Ionick* pilaſters, *&c.* The opening between the ovola's is of two diameters, which being divided into twenty parts, one is for the part of the door-caſe in ſight, which leaves the opening of the door two diameters and one ſixth; the ovola being one twelfth of the aforeſaid opening, and the margent round it one ſixth, which terminates the height of the pilaſters.

The Door V, is yet richer, being adorned with an architrave and *Corinthian* pilaſters; the opening is as before, the architrave being one ſixth thereof, and the margent one twelfth, which terminates the height of the pilaſters, whoſe proportions have been ſhewn before; on the entablature, is raiſed a pediment in two manners, as is eaſily ſeen by inſpection. The cyma is of the ſame bigneſs in either of theſe pediments as at its ends.

N. B. Pilaſters ought never to be diminiſhed in their ſhafts as columns are, unleſs they ſtand immediately behind columns; and then if fluted, they have an ill appearance, on account of the flutes not being perpendicular, as in columns.

The arch U, is adorn'd with *Tuſcan* pilaſters, the height of the opening is one diameter and three quarters, as appears; the width being divided into four parts, one is the diameter of the pilaſter, by which the other parts are proportion'd, as inſpection ſhews.

PLATE Q.

The foregoing Proportions apply'd to Practice in ARCHES, *adorn'd with* COLUMNS *or* PILASTERS.

THESE four arches come under one rule, if duly obſerved. The height only varying according to each order; for inſtance, the *Dorick* arch W, is of two diameters high, which if adorn'd with columns, or pilaſters ſtanding on a plinth, the width of the opening muſt be divided into four parts, (as in the *Tuſcan* in the foregoing PLATE;) one is for the height of the plinth, and is alſo the diameter of the column, and length of the key-ſtone, the width being half its height, if the column ſtand on a pedeſtal, the opening muſt be divided into fourteen parts, and three ſuch parts will be the diameter of the column; the other parts were ſufficiently explain'd in PLATE O. The pilaſter that ſupports the arch, is half the diameter of the column in each, as is alſo the architrave, whoſe mouldings may be ſomewhat plainer, than thoſe of the architrave of the entablature.

The *Ionick* arch X, is two diameters and one ſixth in height, the other parts being proportion'd by dividing as before.

The *Compoſite* arch Y, is two diameters and two ſixths in height, the other parts being proportion'd as before.

The *Corinthian* arch Z; is two diameters and three ſixths, *i. e.* two diameters and an half in height, the other parts being as before.

Note, If pilaſters are uſed in either of theſe caſes, they muſt project forward one fourth part of their diameter, (or more at pleaſure,) on account of the impoſt of their arch finiſhing againſt them. And if columns be uſed, they muſt project forward three fourths of their diameter, (or three fourths of their circumference,) on account of the projecture of the impoſt. By this means the column will appear free, and not encumbered or divided by the impoſt of the arch, as no doubt any perſon may conceive.

N. B. I have endeavoured to compleat the whole, in ſuch a manner, as to make it of general uſe to the ſeveral artificers in building, having all along uſed my utmoſt care to keep up to the general rules of PALLADIO.

FINIS.

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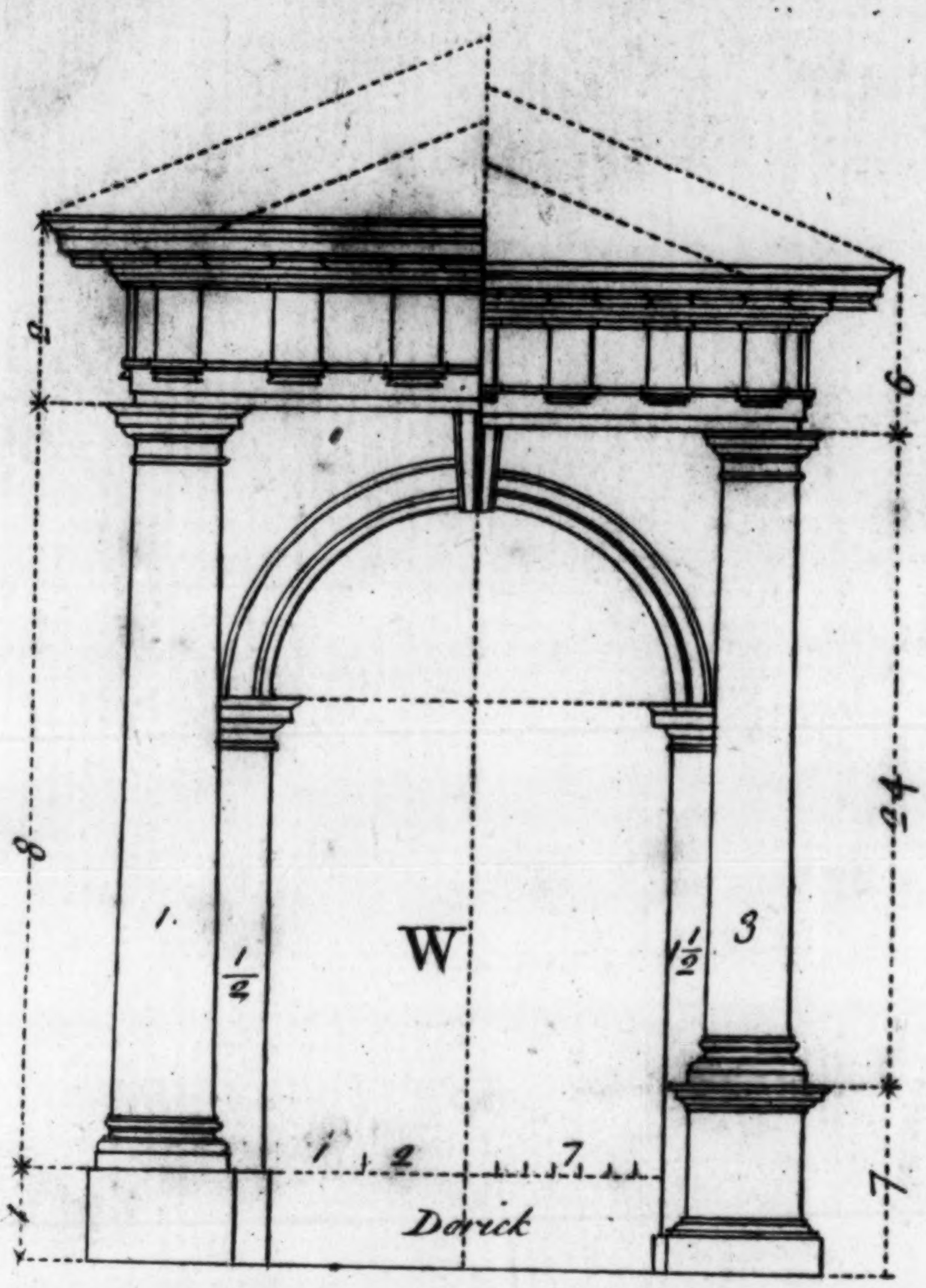
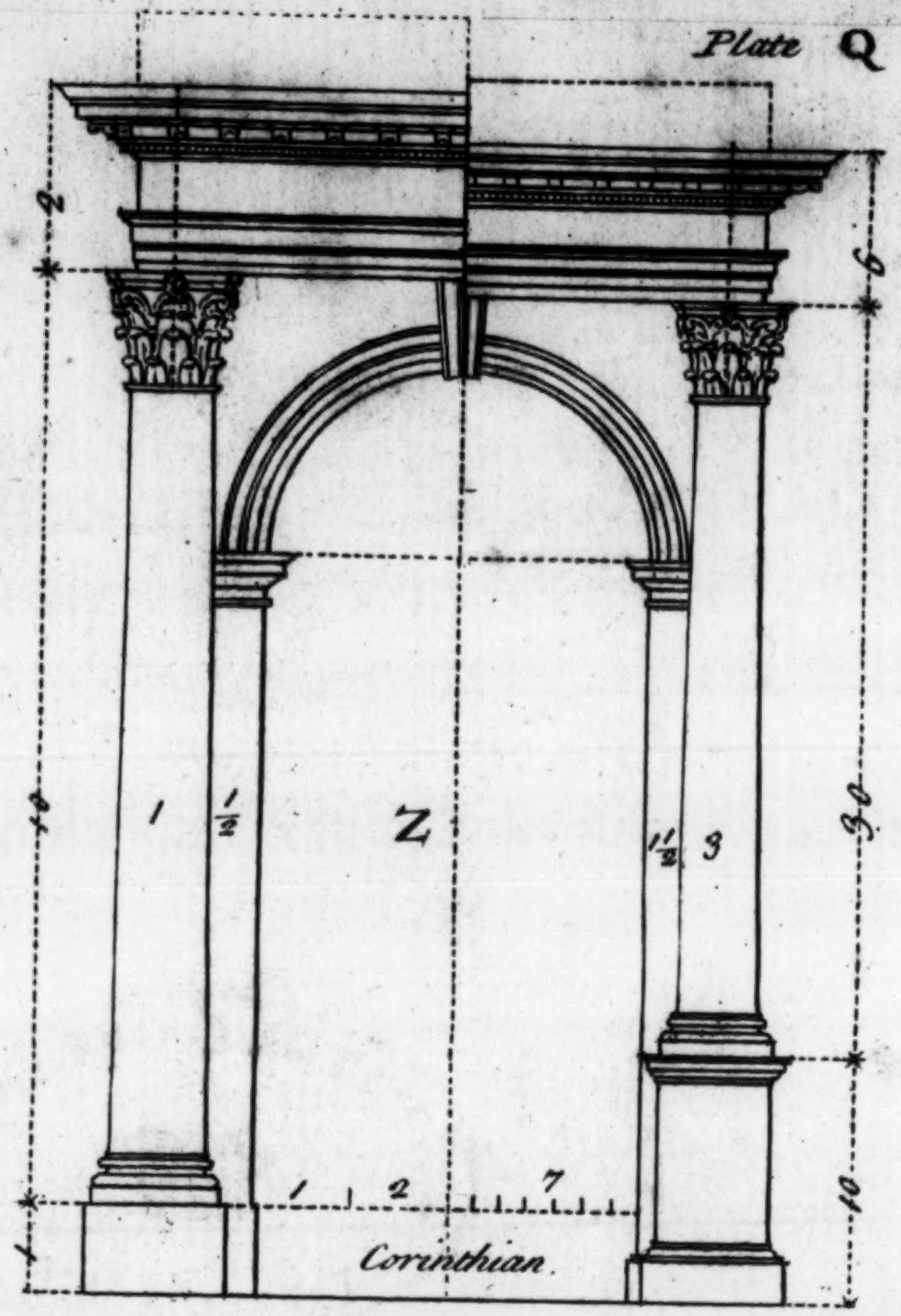
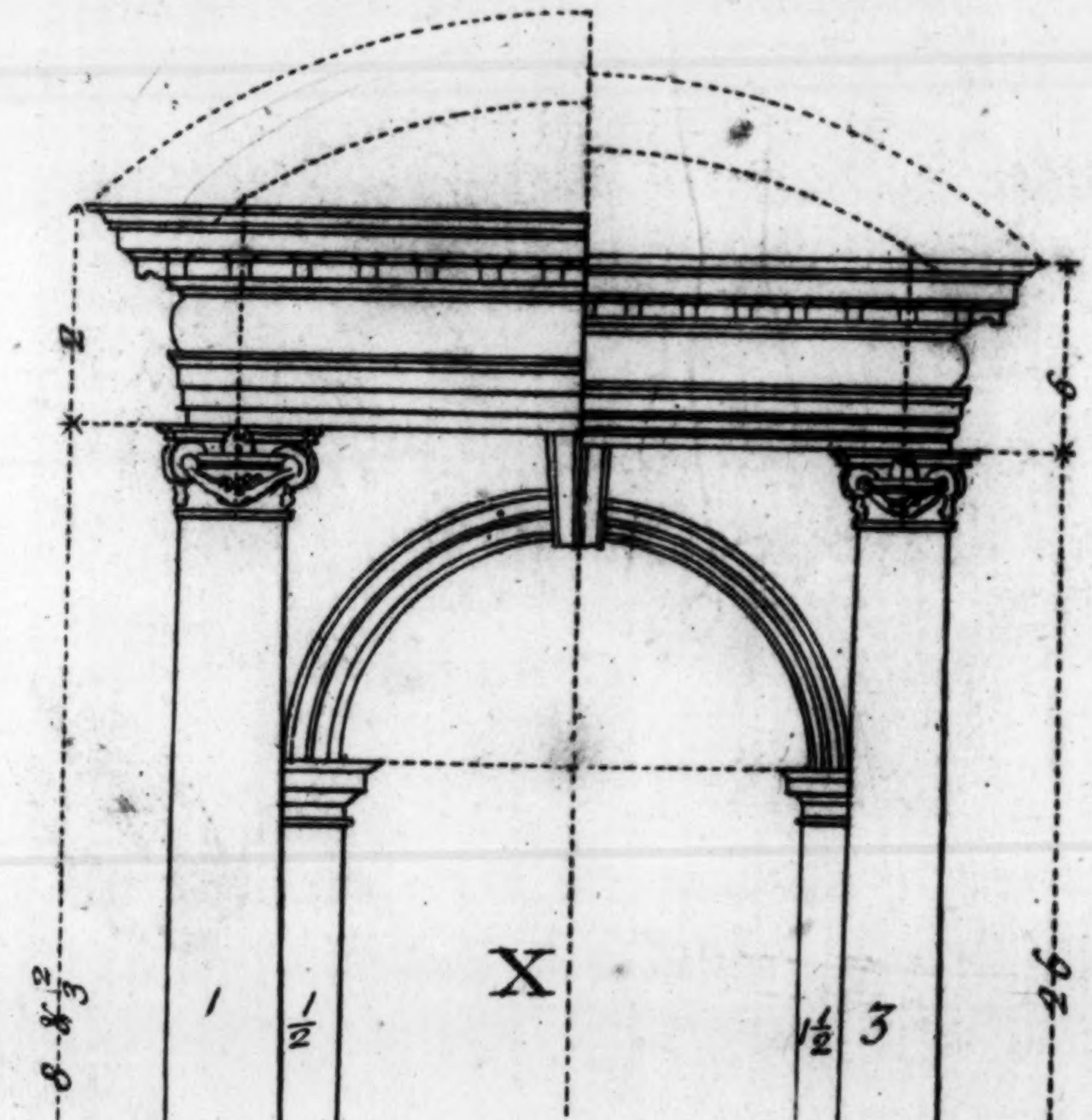
Plate Q



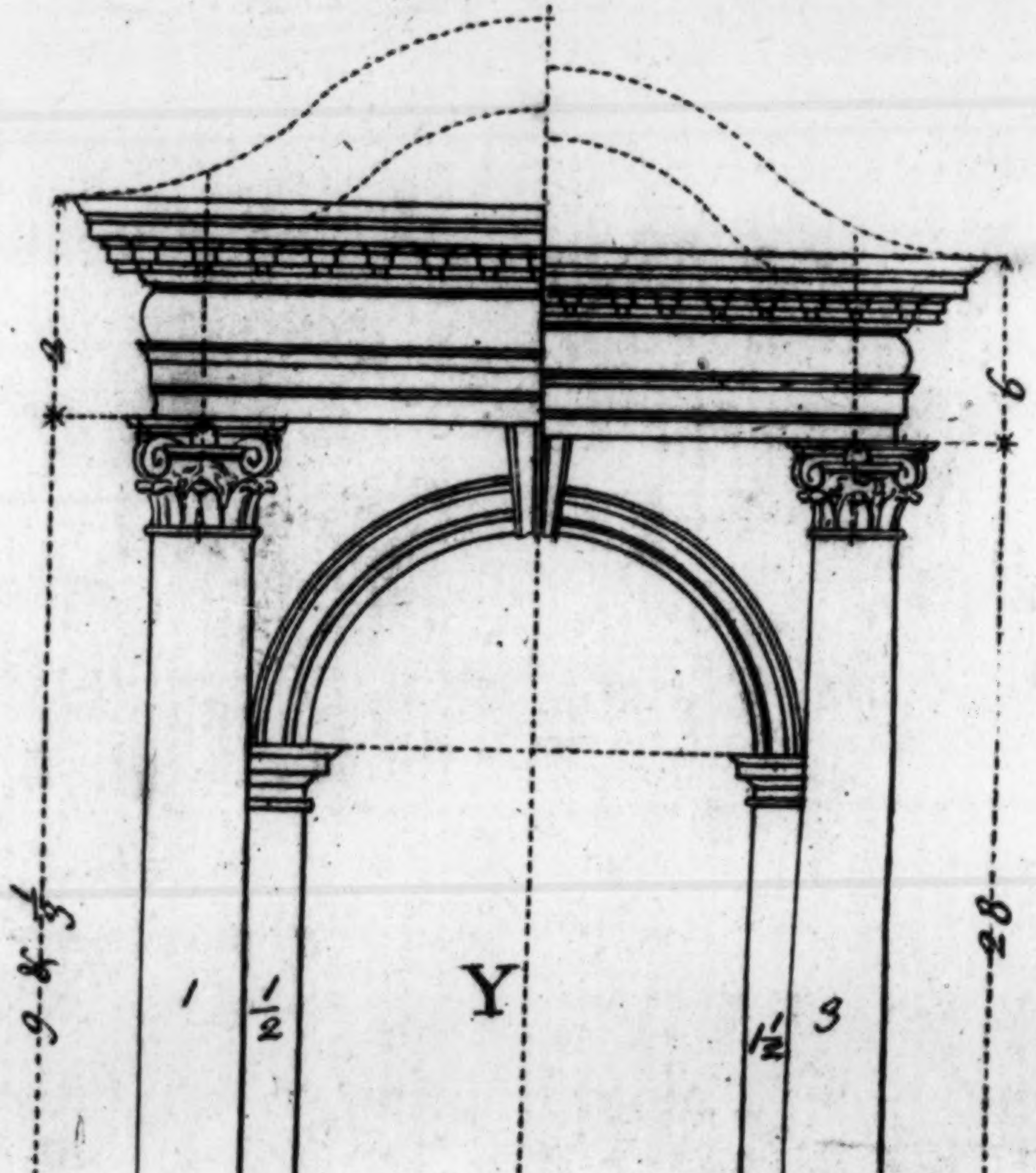
Dorick



Corinthian



Ionick



Composite

F. Price delin

Toms sculp

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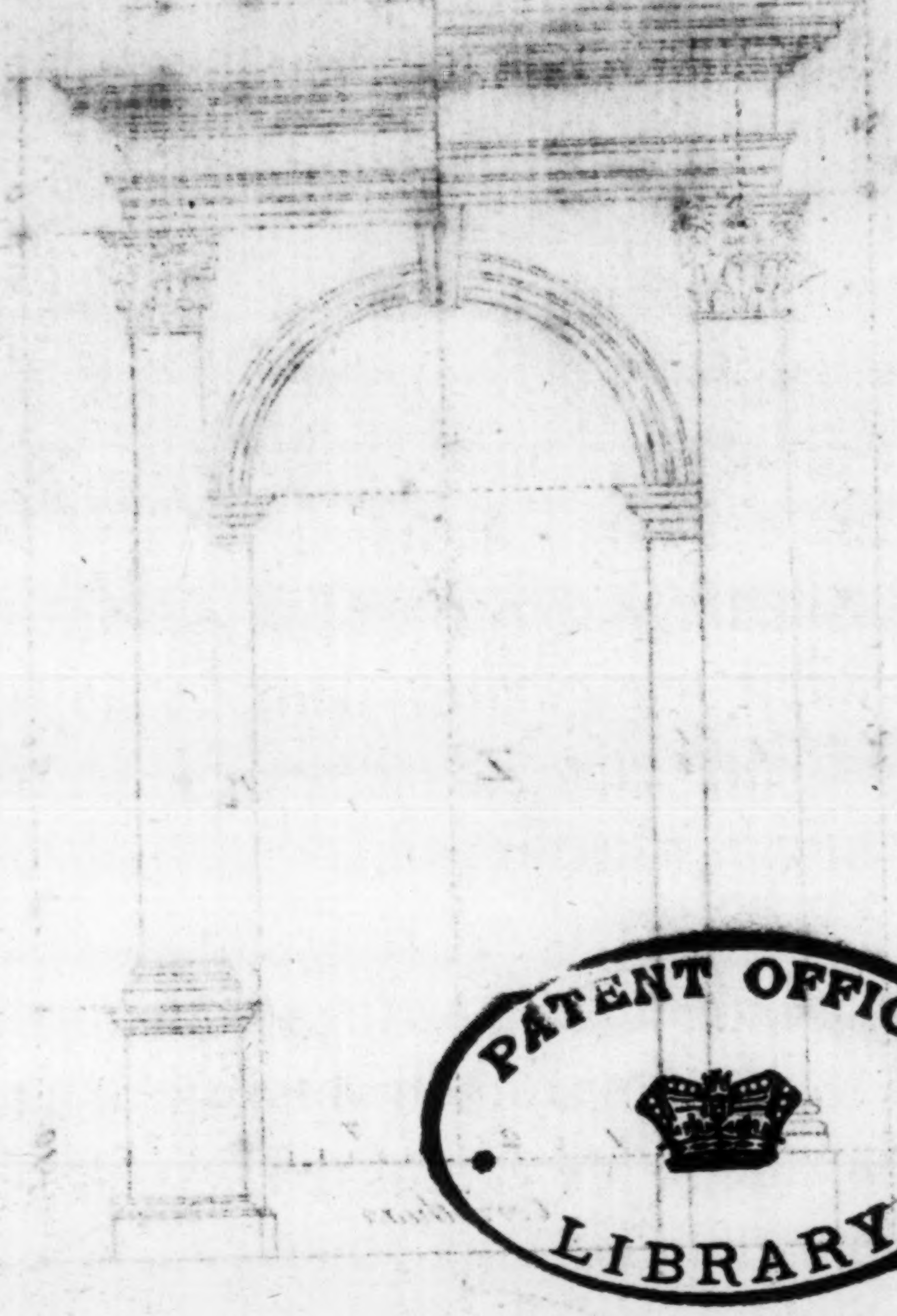

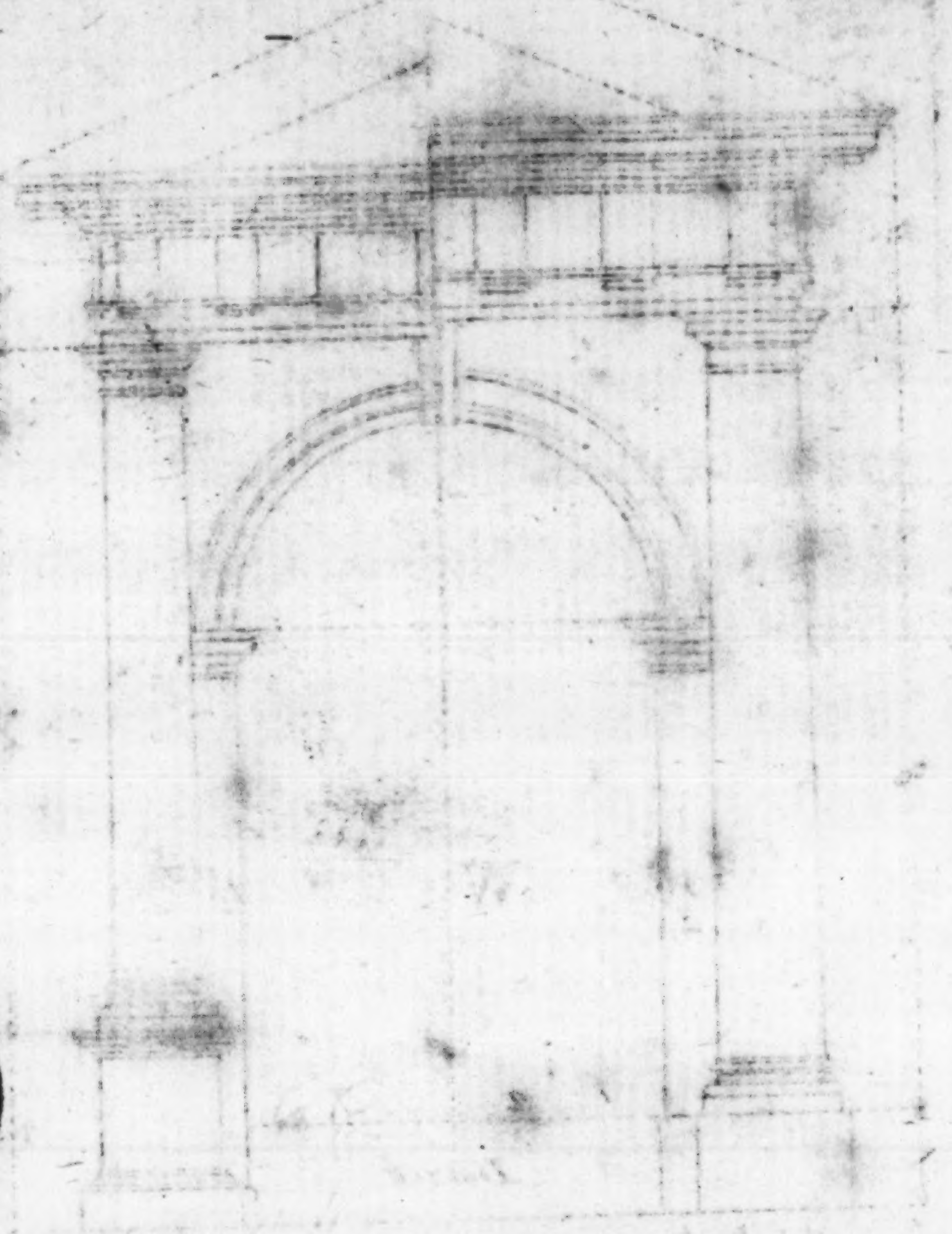

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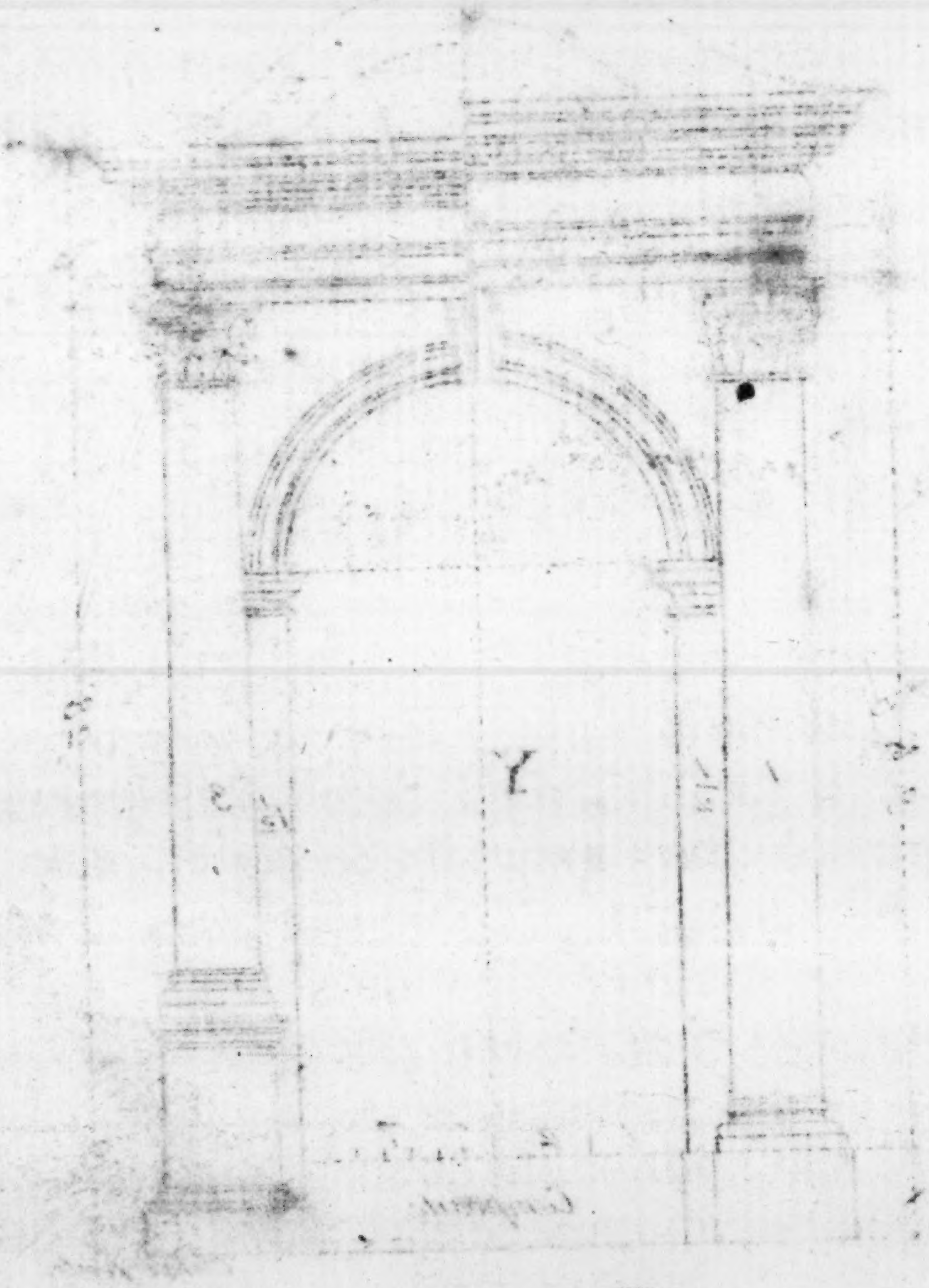

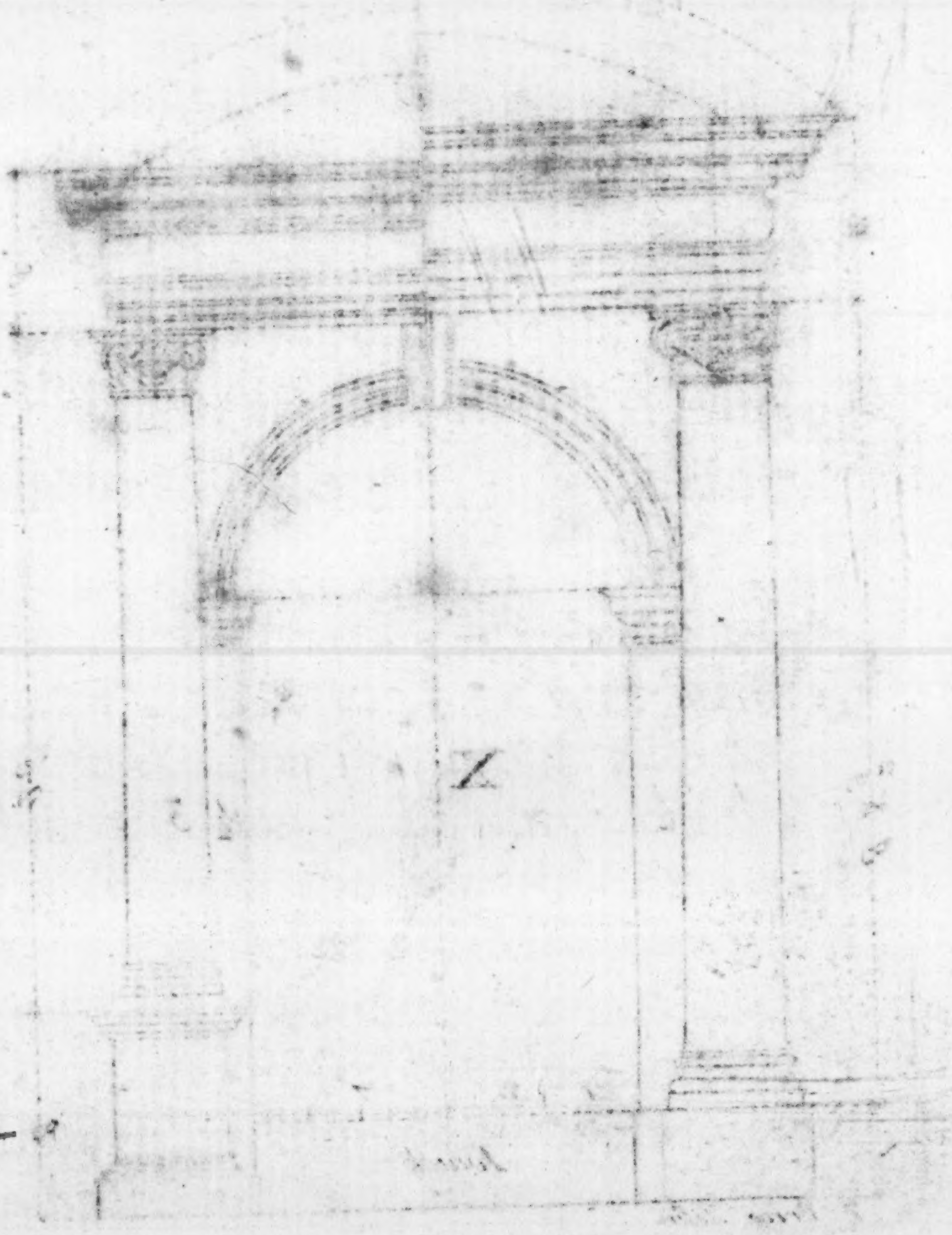

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